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Review of 1987 South Coast Salmon Troll Fisheries

T.F. Shardlow, P.J. Ryall and D.W. Burt

Fisheries Branch
South Coast Division
Department of Fisheries and Oceans
3225 Stephenson Point Road
Nanaimo, British Columbia V9T 1K3

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by

T.F. Shardlow, P. J. Ryall and D.W. Burt

Fisheries Branch
South Coast Division
Department of Fisheries and Oceans
3225 Stephenson Point Road
Nanaimo, British Columbia V9T 1K3

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ABSTRACT

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British Columbia troll fisheries south of Cape Caution were intensively managed for the third consecutive year in 1987. In-season management actions were designed to keep catches of each salmon species within prescribed limits while allowing each fishery to remain open for as much of the season as possible. Troll fisheries in the Strait of Georgia, on the West Coast of Vancouver Island and in Johnstone Strait were managed with combinations of partial and total area closures and periods of non-retention and non-possession for certain salmon species and fisheries. Salmon catches in the Strait of Georgia did not exceed catch ceilings or allocations. The chinook catch for the Strait of Georgia fell short of the ceiling by 11,306 pieces, even though the chinook season was longer than the previous two years. This result indicates a low chinook abundance in the Strait of Georgia in 1987. Gulf trollers landed 95,225 sockeye in 1987 or 2.9% of the Canadian TAC. This is within the allocation of 1.5 to 3.5%, as allocated by the Minister. Pink salmon catches by the Gulf trollers totalled 144,904. This is 3.6% of the total southwardly migrating pink salmon catch by all gear types. The goal was a 4% allocation for Gulf trollers of the all gear catch. Salmon catches were within the prescribed limits on the West Coast of Vancouver Island, except for sockeye and pink salmon. Sockeye catch was 17.6% of the TAC, this exceeds the outside troll allocation of 10.5% to 11.5%. The sockeye salmon overage was primarily due to difficulties in catch monitoring just prior to the closure for sockeye and the large troll sockeye catches in Areas 1 and 2W had a higher contribution of Fraser River sockeye than were estimated in-season. The catch of southwardly migrating pink salmon by outside trollers amounted to 1,390,617 (34.6%). Their allocation for 1987 was 29%. The chinook and coho caught by outside trollers were 380,711 and 1,821,022, respectively. Both of these catch levels were within the obligations of the Pacific Salmon Treaty.

Key words: Pacific salmon, troll fishery management, southern British Columbia.

RÉSUMÉ

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En 1987, pour la troisième année consécutive, la pêche à la traîne en Colombie-Britannique, au sud du Cap Caution, a été étroitement surveillée. Pendant la saison de pêche, les mesures de gestion visaient à faire respecter les limites prescrites pour chaque espèce de saumon, tout en permettant à chaque secteur de pêche de rester ouvert le plus longtemps possible. La pêche à la traîne dans le détroit de Géorgie, sur la côte ouest de l'île Vancouver et dans le détroit de Johnstone a été contrôlée grâce à des fermetures totales et partielles et à des périodes de non retenue et de non possession pour certaines espèces de saumon et d'autre poissons. Les prises de saumon dans le détroit de Géorgie n'ont pas dépassé les limites ou les contingents permis. Dans le détroit de Géorgie, les pêcheurs ont pris 11 306 quinnats de moins que la limite permise, bien que la saison ait été plus longue qu'au cours des deux années antérieures. Les résultats indiquent qu'en 1987, le quinnat était moins abondant dans le détroit de Géorgie. En 1987, les bateaux de pêche à la traîne dans le golfe ont débarqué 95 225 saumons rouges, soit 2,9 % du total des prises admissibles au Canada, ce qui est dans les limites de 1,5 à 3,5 % allouées par le Ministre. Ces pêcheurs ont également pris 144 904 saumons roses, soit 4,7 % des prises totales par engins de pêche de tous types sur la côte sud; l'objectif était une allocation de 4 % pour les bateaux munis de tous types d'engins de pêche. Sur la côte ouest de l'île Vancouver, les prises de saumon ont été dans les limites prescrites, sauf pour la pêche au saumon rouge, qui a été de 17,6 %, dépassant l'allocation étrangère de pêche à la traîne, qui est de 10,5 % à 11,5 %. L'excédent de saumon rouge découlait principalement de la difficulté de surveiller les prises juste avant la fermeture de la pêche, ainsi qu'aux prises de saumon rouge de Fraser, qui était plus abondant que prévu dans les secteurs 1 et 2W. Sur la côte sud, les bateaux étrangers de pêche, à la traîne ont pris 644 688 saumons roses (21 %), soit 9 % de moins que leur allocation pour 1987. Les bateaux de pêche à la traîne étrangers ont capturé 380 711 quinnats et 1 821 022 cohos. Ces deux quantités sont dans les limites prévues dans le Traité concernant le saumon du Pacifique.

Mots clés: Saumon du Pacifique, gestion de la pêche à la ligne traînante, sud de la Colombie-Britannique

1.0 INTRODUCTION

For the third consecutive year troll fisheries in southern British Columbia were actively managed by the Department of Fisheries and Oceans (DFO). Prior to 1985 the troll fishery was not managed on an in-season basis (Shardlow et al. 1986; Argue et al. 1987). Active in-season management was primarily due to the continuation of salmon catch ceilings and allocations for the troll fishery (Table 1, Appendix 1). Catch ceilings for chinook and coho salmon were a requirement of the Pacific Salmon Treaty which was renegotiated in 1987. Catch allocations for Fraser River stocks of sockeye and south coast pink salmon were initiated by the Minister's Advisory Council (MAC). MAC was replaced by the Pacific Advisory Council (PARC) in April of 1987 to continue the discussions on salmon allocations. Unfortunately, PARC was unable to come to a consensus for allocation among user groups of Fraser River sockeye and south coast pink salmon. Consequently, the Minister of Fisheries decided allocation percentages among user groups in 1987. These fixed upper limits to the seasonal catch, necessitated in-season regulation of the troll fishery.

Detailed fishing plans for the troll fisheries were developed in consultation between industry and DFO fishery managers (Appendices 2 and 3). Advisory committees consisting of fishermen, industry representatives and DFO personnel developed the initial fishing plans prior to the 1987 fishing season.

This report documents the 1987 troll fishing plans for southern British Columbia (waters south of Cape Caution, Fig. 1), in-season management actions and resultant catches in pieces for three troll fisheries: Strait of Georgia (historically known as the Gulf or inside fishery, Statistical Areas 13 to 18 and 29), West Coast of Vancouver Island (WCVI, Areas 21 to 27, 121 to 127 and 130-1) and Johnstone Strait (Areas 111, 11 and 12).

1.1 SOURCES OF CATCH DATA

Catch data in this report are from two separate sources. First, in-season catches are provided by the In-season Catch Monitoring Program (ISCMP) (Webb et al. 1983) and are used to make management decisions during the season. These catch figures are provided each week during the fishery, and are continually updated through the course of the season. The second catch data source is provided by sales slips and is accessed from the Pacific Biological Station data base (Wong 1983). In this report, the sales slip estimates are catches as provided by sales slips received up to April 13, 1989.

2.0 STRAIT OF GEORGIA TROLL

2.1 BACKGROUND

The 1987 Strait of Georgia troll fishing plans were drawn up in pre-season meetings with the Inside Troll Advisory Committee (ITAC). ITAC was formed in 1986 to represent the concerns of Gulf trollers. The advisory group wished to have the same basic fishing plan as 1986 but omit the barbless hook restriction. In addition ITAC expressed some concern about sharing available catches between North and South Gulf trollers.

The 1987 salmon allocations to trollers in the Strait of Georgia (Fig. 2), as defined by the Minister of Fisheries, were 50,000 chinook, 1.5 to 3.5% of the Canadian total allowable catch (TAC) of all Fraser River sockeye, and 4% of the southerly migrating pink salmon catch (Table 1). Gulf trollers were given no specific allocation of coho and chum. Since sockeye and pink allocations were in percentages the actual numbers of fish allocated to troll were adjusted during the season as run size estimates were updated.

2.2 DEVELOPMENT OF FISHING PLANS

2.2.1 Chinook

In 1987 the catch ceiling was set at 50,000 chinook for Gulf trollers. This is the same catch ceiling that was in effect during 1985 and 1986. The size limit of 62 cm fork length, adopted in 1986, was continued (the 1985 size limit was 54 cm fork length). The reasons for the introduction of the 62 cm size limit are discussed in detail in Shardlow et al. (1988). Barbless hooks which were first introduced in 1986 were not required during periods of chinook non-retention in 1987.

2.2.2 Coho

Coho fishing plan negotiations with trollers were again difficult in 1987. The Department wanted to constrain harvest rates to levels experienced in recent years. However, no clear guidelines in terms of target harvest rates or catch ceilings had been established by either DFO or the Canada/U.S.A. Treaty to address coho conservation and international concerns with regards to Gulf Trollers.

Troller representatives on ITAC proposed increasing the opportunities for harvesting coho by conducting the fishery from June 15 to September 30. DFO maintained that in order to constrain coho harvest to recent historical levels the traditional July 1 to September 30 fishery was required. This season length has only varied in three of the 22 years since 1965 (1978, 1984 and 1986). In 1978 the season opened for coho and chinook on June 15. In 1984 the season closed early to all species on August 31. In 1986 the troll season opened for coho and chinook on June 20. The 1986 early opening was to coordinate an opening date with the West Coast Vancouver Island troll and to provide additional fishing opportunities for "Expo" coho produced by Georgia Strait hatcheries (hatcheries in the Strait of Georgia increased their production of coho to provide increased fishing opportunity during the 1986 World Exposition). In 1987 the WCVI troll was to open July 1 and "Expo" production would not be available. For these reasons the traditional coho season of July 1 to September 30 was maintained.

2.2.3 Chum

Chum returns to the Central Gulf area have been increasing through hatchery production at DFO's Big Qualicum hatchery. ITAC wanted to share in the harvest of this increased production. DFO agreed that returning south coast chum stocks would be assessed in September for a possible chum only troll fishery in October. Gulf trollers were allocated 2,500 chums in Area 14 through the Canadian Fishing Industry Council (CFIC) to be harvested during equal, but separate times from gillnet openings in Statistical Area 14. This fishery would be the first targeted chum troll fishery in the Strait of Georgia.

2.2.4 Sockeye and Pink

The catch allocation for sockeye was from a minimum of 1.5% to a maximum of 3.5% of the expected Canadian total allowable catch (TAC) of Fraser River sockeye (Table 1). Based on a pre-season expected Canadian TAC for Fraser River sockeye of 2,389,000, the Gulf troll allocation was anticipated to range from a minimum of 36,000 to a maximum of 84,000 pieces.

The Strait of Georgia troll catch allocation for pink salmon was set at 4% of total southerly migrating pink salmon commercial catch (Table 1). Based on a pre-season expected Canadian catch of 3,572,000, the Strait of Georgia troll allocation was anticipated to be 143,000 pink salmon.

For management purposes the Gulf troll sockeye and pink fisheries were classified into three separate regions: 1) upper

Area 13 (above Seymour Narrows)[1], 2) Central Gulf (lower Area 13 to Area 18)[2] and 3) Fraser River area (Areas 29 and 18)[3]. In upper Area 13 and Fraser River areas, troll fisheries were to be conducted at equal but separate times to gillnets. In the Central Gulf, trolling was to be permitted 7 days per week. Historically, most sockeye and pink salmon catches occur in upper Area 13 and Fraser River areas.

In 1987, fishing plans were designed to achieve two major goals. First, to attain the catch allocations, and second, to ensure that the Gulf allocation of pink and sockeye was apportioned equitably between the North and South Gulf trollers (North Gulf includes upper Area 13 and Central Gulf). To meet the second requirement, troll openings in upper Area 13 and in the Fraser River area were to be coordinated and conducted within a day of each other. This close coupling of openings was to minimize the transfer of trollers from the Fraser River area to upper Area 13. These two areas are sufficiently far enough apart to discourage travel from one opening to the other. Additionally, separate openings were considered for the north and south, if required to achieve the appropriate split.

2.3 CATCH AND IN-SEASON ACTIONS FOR STRAIT OF GEORGIA

2.3.1 Chinook

Trolling for chinook began on July 1 and continued uninterrupted until the season ended as scheduled on September 30 (Table 2). The total chinook sales slip catch was 38,694 pieces (Table 3) which was 11,306 pieces or 23% less than the ceiling of 50,000 pieces. This is the lowest catch on record for 13 weeks of fishing despite similar effort to 1985 and 1986[4]. Shoreline closures to restrict chinook catch, which were used for 6 days in 1986, were not used at all in 1987. The catch resulting from this fishing regime indicate a low abundance of chinook in the Strait of Georgia in 1987.

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[1] Stat. Areas 13-7 to 13-10 and 13-27 to 13-32.

[2] Stat. Areas 13-1 to 13-3, 13-14 to 13-20 and 13-23, Area 14 (except 14-11 and 14-14), Area 15 (except 15-6), Area 16, Area 17 (except 17-7, 17-14, 17-15 and 17-9), Areas 18-2 to 18-7, 18-9, 18-10 and Area 29-5.

[3] Stat. Areas 29-1 to 29-4, 29-6, 18-1 and 18-11.

[4] In 1985, 1986 and 1987 there were 8352, 7802 and 8384 boat days of effort, respectively in the Strait of Georgia.

2.3.2 Coho

Coho trolling continued uninterrupted until September 30 when the main Gulf fishery closed as scheduled (Table 2). The final catch was 217,524 pieces (Table 3). This is a modest increase over coho catches of 181,419 in 1986 and 191,207 in 1985. Thus, DFO's goal of keeping the troll coho harvest rate within recent levels by maintaining fishing effort was basically met. Fishing effort in 1987 was 8,414 boat days compared to 8,362 and 7,802 in 1985 and 1986, respectively. While we cannot measure what the actual harvest rate in the fishery is we believe that maintenance of similar effort and catch levels will have the corresponding effect on harvest rate levels.

2.3.3 Sockeye

Sockeye concerns dominated troll management activities from August 2 to August 16. The numerous time and area closures implemented are summarized in Table 2. For the most part, the sockeye fishery followed the general outline provided in the pre-season plan (Appendix 2). Sockeye opened to trolling on August 2 and closed on August 16. At this time the catch was estimated to be 72,000 and the remainder of the allocation of up to 10,000 pieces was to be taken during the anticipated targeted pink fishery. However, on August 29 the sockeye troll fishery was reopened again as the sockeye run size estimate had been upgraded (August 28) from 6.2 million to 7.3 million. The final sockeye closure was September 9 when it was believed the allocation had been taken. No sockeye were saved for a targeted pink fishery as such a fishery did not occur in 1987 (see Section 2.3.4).

The post-season run size was 7.66 million Fraser river sockeye which was 23% larger than the pre-season forecast (Pacific Salmon Commission, 1988). The corresponding post-season Canadian TAC was 3,232,000 sockeye (Tables 1 and 4). The total Strait of Georgia troll sales slip catch for 1987 was 95,225 pieces (Table 3) which was 2.9% of the Canadian TAC and within the 1.5 to 3.5% range designated by the Minister of Fisheries (Table 4).

As mentioned previously, a second goal was to apportion the sockeye catch between North and South Gulf trollers. However, the North/South catch ratio has historically shown a wide variance (mean = 0.8, SD = 0.5; 1979, 1981 - 86) and no clear guidelines for apportioning the catch exist. Thus DFO management biologists attempted to obtain a catch split that was fair to both the North and South Gulf trollers. In 1987 only 1 day was permitted in the Fraser River Panel area (south Gulf) for sockeye during which approximately 33,000 sockeye were landed. The balance were caught in the North Gulf. The resultant catch split was 65% North and 35% South. Thus, it is believed that the goal of an equitable North / South split was achieved in 1987.

2.3.4 Pink

Pink fishing began July 1 and continued until September 3 (Table 2). No targeted pink fishery was permitted in the Fraser Panel area (south Gulf) in 1987 due to a lower than anticipated run size and because the allocation had already been achieved by incidental catches during fishing for other species.

The total commercial catch of southwardly migrating pink salmon was 4,017,679. The total Strait of Georgia troll catch was 144,904 pinks (Table 3). The latter figure is 3.6% of the catch of southwardly migrating pink salmon (Table 4). Thus the pink allocation of 4% to Gulf trollers was very nearly achieved.

2.3.5 Chum

As in most years, the chum catches were low in 1987 and no action was taken to limit harvest of this species during the regular season. At the close of the season on September 30, the sales slip catch was 125 pieces (Table 3). However, in 1987 a separate targeted chum fishery was permitted in Area 14 for four days during October and November (Table 2) to a maximum of 2500 pieces. Catch results from this fishery were 463 pieces raising the 1987 Strait of Georgia chum catch to a total of 588 pieces. In the last 10 years only 1984 had a lower catch (96 pieces).

2.3.6 Summary

The Strait of Georgia troll season started July 1 and continued until September 30. Final 1987 troll catches are compared to post-season sockeye and pink allocations and chinook catch ceilings in Table 4. The chinook catch was 23% less than the ceiling while pink and sockeye catches were within the range of their allocations. Coho and chum salmon in Georgia Strait had no ceiling to their regular seasonal catch in 1987, however, chum had a late season allocation of 2,500 pieces. Coho accounted for the largest Strait of Georgia salmon catch in 1987 at 217,524 pieces (Figure 3), followed by 144,904 pink, 95,225 sockeye, 38,694 chinook and 588 chum.

2.4 STRAIT OF GEORGIA TROLL GEAR COUNTS

Aerial counts of trollers fishing in the Strait of Georgia were made throughout the 1987 season to enable timely catch estimation (Table 5). As has been done in previous years troll counts were conducted in conjunction with the Georgia Strait creel survey flights (Shardlow and Collicutt, 1989). The flights cover a distance from Sheringham Point off Victoria to Granite Point north of Campbell River and utilized two flight paths (Fig. 4).

All troll gear sighted were recorded by Statistical Area. There were 29 such flights during the 1987 troll season from July 1 to September 30. On occasion, flights supplementary to the scheduled creel survey flights were chartered to meet the need for immediate effort information. There were only three such counts made between July 1 and September 30, those being on August 6, 13 and September 2. These flights were necessary to monitor effort during sockeye fisheries. Effort counts, in combination with catch per unit effort estimates obtained by ISCMP samplers were used to calculate in-season catch estimates.

In late October, for the Area 14 directed chum fishery, gear counts were made by fishery officers during on-water hails. Numbers of troll vessels observed fishing were 20, 24, 16 and 10 on October 23, 24, 27 and November 12, respectively.

2.5 STRAIT OF GEORGIA SUBLEGAL SAMPLING PROGRAM

In 1987 South Coast Division initiated a two year program to collect information on sublegal[5] chinook and coho caught by West Coast Vancouver Island and Strait of Georgia trollers. The objectives were to determine release rates of sublegal chinook and coho in the troll fishery as well as the size, age and sex distributions of these fish. This section presents the results from Strait of Georgia trollers. Discussion will be restricted to the reporting of results leaving analyses to future years when a larger and consequently more reliable sample base has been achieved.

Three Strait of Georgia troll vessels, the "Rolomar", the "Margaret E" and the "Islander" were commissioned by DFO to participate in this program during the normal course of their commercial fishing. Program duration was July 1 to September 21. Daily logs were kept of Statistical Areas fished, hours fished (lines in water), number of adults kept, number of sublegal chinook and coho released, and number of sublegal chinook and coho retained for sampling. Once every ten fishing days all sublegal chinook and coho caught were cleaned, sexed and retained for sampling by DFO personnel at port. If less than 12 of each species were caught on these days then sampling was extended over subsequent days until the minimum sampling quota was obtained. Additionally, on all days any adipose clipped sublegal chinook and coho were cleaned, sexed

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[5] Sublegal chinook refers to those less than the minimum size limit (62 cm fork length for the Strait of Georgia and 67 cm fork length for West Coast Vancouver Island). Sublegal coho are those less than 48 cm fork length except during July 1 to August 31 when it is those less than 30 cm fork length. Released fish in this section <u>does</u> <u>not</u> refer to adult "shakers" during non-retention periods.

and retained. At port fish were sampled for scales and length by DFO personnel. Length and scale sampling of sublegal chinook and coho was also undertaken by DFO's vessel, the RD 104, in March and June.

To assess how well catches by participating test fishermen represented troll fishery catches the proportion of each species caught relative to the total catch, and the average catch per day (CPE) for each species were compared with Strait of Georgia troll landings from sales slips (Table 6). Fishermen participating in the program appeared to have proportional catches similar to the fleet and CPE's that were higher for chinook and lower for sockeye and pink than the fleet average. This is probably due to the test boat, "Islander", continuing to target on chinook during sockeye and pink retention periods.

Average weekly catch rates of sublegal chinook and coho are illustrated in Figure 5. Weekly catch rates of sublegal chinook increased after statistical week 8/1 and peaked in week 9/3 at 4.5 chinook per hour. The seasonal average was about 0.6 sublegal chinook caught per hour. These rates may be higher than the fleet average for chinook since the test vessels were targeting on these species. Average weekly catches of sublegal coho peaked in week 9/4 at 3.4 coho per hour. The seasonal average for coho was about 1.1 sublegal coho caught per hour.

Weekly percentages and observed frequencies of chinook and coho catches that were sublegals are shown in Figure 6 and Table 7, respectively. The percentage of sublegals caught increased for both species as the season progressed. Over the troll season 40% of the chinook catch and 33% of the coho catch were sublegals.

Percentages of sublegal chinook and coho at each age are shown in Table 8. For sublegal chinook two-year-olds were the dominant age class in all months. One year old chinook were not captured in July, but made up a significant proportion of the sample in September. For all months combined, age two's comprised 68% of sublegal chinook caught followed by age three's at 25%. For sublegal coho, two year olds were predominant in all months and composed about 97% of all sublegal coho sampled. Three year olds and one year olds formed minor components (2.2% and 0.4%, respectively) of sublegal coho caught.

Mean fork length of each age of sublegal chinook are provided in Table 9. Mean length of a particular age sometimes decreased with successive months possibly because of population differences between months. However, in other cases, small sample sizes do not permit useful comparisons among months.

Mean fork length of sublegal coho at each age are given in Table 10. Mean length of the dominant age group (two year olds)

increased from 261 mm in July to 271 mm in August to 281 mm in September.

Percentages of sublegal male and female chinook and coho are shown in Table 11. For chinook, all months combined, 59% were male and 41% were female. For coho, all months combined, 72% were male and 28% were female. The high proportion of male coho may be owing to misidentification. A number of sublegal coho caught had undeveloped gonads that fishermen assumed to be males. Future Sublegal Sampling Programs should have a portion of the sublegal catch returned in the round so that biological staff can assess sex.

Percentages of all sublegal chinook and coho caught with marks (i.e., missing an adipose fin) was 5% for both chinook and coho (N=983 for chinook and 1,972 for coho). Stock distribution in the catch will be analyzed and reported in a future report.

3.0 WEST COAST VANCOUVER ISLAND TROLL

3.1 BACKGROUND

The 1987 West Coast Vancouver Island (WCVI) troll fishing plans were drawn up in pre-season meetings with the Outside Troll Advisory Committee (OTAC). OTAC was formed in 1986 to represent the concerns of WCVI trollers and consisted of representatives from the Pacific Trollers Association (PTA), Native Brotherhood, Northern Trollers Association (NTA), United Fishermen and Allied Workers Union (UFAWU), Pacific Seafood Council and Fisheries Council of B.C. (FCBC).

For the third consecutive year WCVI management plans were directed toward two major goals: (1) keeping troll harvest of chinook and coho within the catch ceilings specified by the Pacific Salmon Treaty; and (2) obtaining domestic allocation targets for Fraser River sockeye and southerly migrating pink salmon. The 1987 catch ceilings and allocations are summarized in Table 1. For chinook and coho, catch ceilings were 360,000 and 1.8 million, respectively. Troll catch of sockeye was to be limited to a range of 10.5 to 11.5% of the Canadian total allowable catch (TAC) of Fraser sockeye. The pink allocation was to be 29% of south coast pink salmon commercial catch. There was no specific allocation for chum, however, the Minister directed that the catch be limited to historic levels (Appendix 1). If chum catches increased relative to the run strength, measures would be initiated to curtail this fishery. The management subareas covered by the aforementioned catch ceilings and allocations are shown in Figures 7 and 8.

3.2 DEVELOPMENT OF FISHING PLANS

Catch ceilings coupled with the understanding that the troll season and areas were to remain similar to recent years, provided a framework for WCVI fishing plan discussions. Also considered, was DFO's desire to avoid, where possible, non-retention fisheries due to the disruptive effect of high shaker catches on fish stocks.

The resultant fishing plan consisted of:

1) An opening date for chinook, coho and chum of July 1 and for pink and sockeye of about August 2 plus or minus one week depending on run size and stock composition.

2) An increase in the minimum size limit of troll caught chinook from 62 cm to 67 cm fork length.

3) Management of chinook and coho fisheries by maximum catch guidelines called red line catches.

4) Specified area closures to be instated if it became necessary to slow catch rates (thereby avoiding non-retention fisheries (Figure 10).

5) Continued closure of Swiftsure Bank (as in 1986) in accordance with the Pacific Salmon Treaty (see Figure 10, area D).

6) Stricter enforcement of the six gurdie regulation.

Further details of the 1987 WCVI troll plan are available in Appendix 3. Anticipated effects of the new chinook size limit, model analyses of the proposed fishing plan, and development of red line catches are discussed in the next three sections.

3.2.1 New Chinook Minimum Size Limit

For the 1987 season the minimum size limit for troll caught chinook was increased from 62 cm to 67 cm fork length. This action was taken to make the West Coast troll minimum size limit equivalent to that used in the United States troll fishery. The catch ceiling was to remain unchanged at 360,000 chinook.

An analysis of the effects of the new minimum size limit was undertaken (B. Riddell 1987, DFO internal document) for consideration by the Canadian Chinook Technical Committee and the Canadian Sections of the Pacific Salmon Commission. Using available data on length frequency, age composition, sex ratio and shaker incidence, it was estimated that a catch of 360,000 chinook at the larger size limit would increase the landed weight of the catch by 20% and increase the impact of the fishery on chinook

stocks by 9%. ("Impact" here is the sum of the number of female spawners that would probably be caught by the fishery, and the estimated number of shaker mortalities.) From the available length-weight data it was expected that average landed weight per chinook would increase from 10.6 lbs. to 12.7 lbs.

3.2.2 West Coast Troll Model

At OTAC meetings, prior to the 1987 troll season, simulations of various fishing plans were made with the West Coast Troll Model (English et al. 1988). These simulations were used as an aid in evaluating the relative benefits and costs of the various proposed fishing plans and regulations.

The basic fishing plan called for an opening date of July 1 and closure on September 30 or at attainment of the catch ceilings. All simulations assumed fishing for chinook, coho and chum would commence July 1. Runs were made with opening dates for pink and sockeye retention varying from statistical week 7-5 to week 8-2. Effects of the new proposed minimum size limit for chinook were evaluated by simulating fishing at 62 cm, 64.5 cm and 67 cm size limits. The intermediate size limit of 64.5 cm was considered as a possible "effective" size limit given that not all fishermen would honour the new limit or that the new regulation would not be in effect for the entire season. The proposed Swiftsure Bank closure for the duration of the season was also evaluated using the West Coast Troll Model.

The results of the modelling exercise are found in Appendix 4 (two base runs plus seven simulations). An increase in the minimum size limit for chinook from 62 cm to 67 cm was predicted to decrease the West Coast troll catch by 9% but increase the landed weight of the catch by about 10% (simulation 1). Runs incorporating the new chinook minimum size limit plus the Swiftsure Bank closure, however, predicted that the chinook catch would be decreased by 22% and the landed weight decreased by 7% from the chosen base. These model runs were based on an average weight of 10.6 lbs. when fishing to a 62 cm minimum size limit and an expected 12.7 lb. average weight at the 67 cm minimum size limit. Abundance was also assumed to be similar to recent averages which as it turned out was an under estimate. Model runs for pink and sockeye indicated that given pre-season run size and timing estimates, WCVI trollers would catch their allocations regardless of which starting date was chosen (simulations 6 and 7).

3.2.3 Red Line Catches

As was done the previous two seasons, it was agreed that WCVI chinook and coho fisheries would be managed so as not to exceed weekly maximum catches known as red line catches (Tables 12

and 13). The objective was to conduct a fishery starting July 1 for chinook and coho that would allow catch ceilings to be achieved by statistical week 9/3 thus avoiding the need for non-retention fisheries. If catches exceeded the red line values, then restrictions (e.g., area closures) would be imposed until catches were restored to the ideal level. The proportions by which red line catches exceeded ideal catches were larger at the beginning of the season than at the end for two reasons. Firstly, higher than ideal catches could be compensated by management action with greater ease early in the season than similar catches later in the season. Secondly, confidence about catch estimates tends to increase later in the season as more sampling data becomes available. That is, there is less certainty in the accuracy of early catch estimates and larger red line percentages reflect this uncertainty.

chinook

The West Coast Troll modelling exercise forecasted that without management action the 1987 West Coast troll chinook catch would reach 370,000 pieces by week 9/4 (Table 12, expected catch). Assumptions used in the model simulation were the following:

1) Chinook abundance in 1987 similar to the 1982-86 average.

2) Fishing effort and prices similar to 1986.

3) Fraser River pink salmon run size expected to be 11 million with a 30% diversion rate.

4) South Coast sockeye run size expected to be 6 million with a 25% diversion rate.

5) Season length from 7/1 to 9/4 or until respective allocations achieved.

It is believed that the assumption 1 about average abundance was incorrect and that chinook abundance was much higher than expected. For this reason actual catches progressed more rapidly than expected (Table 12).

To determine red line catches, the catch of 360,000 was distributed weekly according to the average 1985-86 weekly catch distribution. These two recent years were chosen as most likely to represent the weekly fishing effort distribution anticipated for 1987. An incremental percentage, starting at 30% for week 7/1 and diminishing to 1% for week 9/3, was added to each week's ideal catch to establish weekly red line catches. Weekly expected, ideal and red line catches are shown in Table 12 and Figure 9.

Contingency area closures that involved minor boundary changes from those of 1986 were developed pre-season to be

implemented if 1987 catches exceeded red line values (Figure 10).

coho

The 1987 catch ceiling for WCVI troll caught coho was established at 1.8 million pieces, an increase of 50,000 pieces over the ceiling of 1.75 million in effect for 1985 and 1986. Expectations for 1987, based on the previous 6 year average (1981-1986), were for a catch very close to the 1.8 million ceiling by week 9/4 (Table 13). This would be an ideal catch reaching the ceiling at season end. Weekly catches were incremented by a permissible red line value starting at 30% in week 7/1 and decreasing each week to 1% in week 9/3. Weekly catches for 1981-1986 and the 1987 ideal and red line catches are shown in Table 13 and Figure 11.

A coho contingency closure known as the 980 line, which refers to the area southeast of Loran C line 5990-Y-28980, was established prior to the season to be implemented after consultation with trollers if catches exceeded red line values (Figure 10).

sockeye, pink and chum

The pre-season estimated Canadian TAC for Fraser River sockeye was 2,389,000 with an anticipated West Coast troll catch of 251,000 to 275,00 pieces (Table 1). The pre-season estimated South Coast TAC of Fraser River and Study Area pinks for all gear types was 3,572,000 with a catch of 29% or 1,035,880 pieces for West Coast trollers. These were not managed using red-line catch progression for two reasons: (a) because of the short time anticipated for trollers to harvest their sockeye and pink allocations; (b) and the fact that the above catch ceilings could change in-season due to revisions to pre-season run size predictions. For chum salmon no specific allocation was made and therefore there was no intent to manage to red line catches.

3.3 CATCH AND IN-SEASON ACTIONS FOR WCVI

The in-season management actions for the WCVI troll fishery are summarized in Table 14. Weekly catches by species and days fishing as reported in sales slips, are presented in Table 15 and Figure 12. Details of catch and in-season actions for each species are described below.

3.3.1 Chinook

Trolling for chinook began as scheduled on July 1. In-season catches exceeded red line values throughout the season (Figure 13, Table 12). On midnight of July 11 and 16 (statistical

week 7/3) "Chinook Number 2" and "The Wreck" area closures (Figure 14), respectively, were instated in attempts to slow the catch rate of chinook by West Coast trollers ("Swiftsure" was already closed for the season as designated in the pre-season plan). These actions, however, were insufficient to reduce catches to the ideal catch rate (Fig. 9). As a result, trolling for chinook was closed early in the season on August 17 (statistical week 8/3) and a 7 day period of chinook non-retention occurred until the WCVI troll closed to all species on August 24 (Table 14).

At the time of closure, in-season catch estimates indicated a chinook troll harvest of 421,800 not including Area 12 catch (Table 12). Post-season sales slip catch estimates, however, which form the official values, indicated a chinook catch of 378,931 pieces from WCVI (not including Area 12 catch) (Table 15). This discrepancy was primarily due to time lags in the reporting and processing of sales slips which are used to update in-season catch estimates. Table 16 shows the in-season catches upon which management decisions were made and how these catches changed as updates are obtained. The result is that fishery managers, although making decisions on the best available data, may close the fishery before or after a ceiling has been achieved.

3.3.2 Coho

In 1987 no management actions were taken to slow the troll harvest of coho as in-season catches were consistently less than red line values until week 8/3 (Figure 15, Table 13). At the end of week 8/3 the in-season catch estimate (1,843,700 pieces) indicated that the allocation had been exceeded, however, trolling for all species closed 2 days into week 8/4 and therefore no management action was taken. Coho catches as seen each week during the fishery are found in Table 17.

As mentioned above (Section 3.3.1), management decisions are made based on in-season catch estimates despite the uncertainties of the estimates. These catch estimates for WCVI coho, and how they changed over time, are shown in Table 17. When compared to sales slip catches (Figure 15) in-season catch estimates tended to underestimate sales slip catches until week 8/2 and overestimate them from week 8/3 on.

3.3.3 Sockeye and Chum

Sockeye opened to trolling on August 7 and closed 10 days later on August 17 when it was believed the allocation had been taken (Table 14). Post-season sales slip catch estimates indicated that 475,510 sockeye had been taken in Areas 121-127 and 130-1, a further 22,873 were caught in Areas 11 and 12 (Table 15). Troll catches in Areas 1 and 2W of Fraser River sockeye were 71,000

(Pacific Salmon Comm., 1988). This brought the total outside troll catch to 569,383 fish (17.6%). This exceeded the maximum allocation of 372,000 by 197,383 pieces, their allocation was 10.5 to 11.5% of the Canadian TAC (Table 4). This overage was primarily due to problems in obtaining timely and accurate in-season catch estimates. The problem was compounded by two other factors: (a) higher than expected catch rates near the end of the 10-day sockeye retention period for fisheries in Areas 121-127; and (b) large troll catches in Areas 1 and 2W which had higher contributions of Fraser River sockeye than were estimated in-season.

The outside troll fishery was affected by changes in the migratory behaviour of sockeye. The outside troll fishery opened on a pulse of sockeye migrating southeastward along the west coast of Vancouver Island and through Johnstone Strait. The diversion rate was estimated to be 50% to 60% through Johnstone Strait (Pacific Salmon Comm., 1988). When it was decided to announce a closure date for the fishery, catch rates were declining. However, a second pulse of sockeye entered the main trolling areas along the west coast of Vancouver Island at this time (Areas 123 and 124) (Pacific Salmon Comm., 1988). The resultant higher than expected catch rates caused an overage, by the time the fishery was to close at midnight August 16.

WCVI chum catches were low in 1987 and consequently this species was fished for the entire troll season (July 1 to August 23). The final sales slip catch was 18,588 pieces (Table 15). As with the Strait of Georgia chum catch, this was one of the lowest catches in the last 10 years (1977 and 1981 had lower catches of 13,564 and 16,221, respectively) and was only 20% of the 1977-86 average (90,966 pieces).

3.3.4 Pink

Pink salmon was open to trolling from August 7 to the end of the troll season on August 23 (Table 14). As PARC could not reach a consensus with regards to the allocation of south coast pink salmon the Minister made the decision. Accordingly, the Minister decided that the catch of southerly migrating pink salmon would be 4% for Gulf trollers; 29% for outside trollers; 9% for gillnetters; and 58% for purse seiners (Appendix 1). The Gulf troll catch was 144,900 (3.6%), gillnetters landed 415,200 (10.3%), the purse seiners 2,066,900 (51.4%) and 1,390,600 (34.6%) by outside trollers. Post-season sale slip records show that 644,688 pinks were harvested by outside trollers in the south coast. The remainder of the outside troll catch of southerly migrating pink salmon was taken in the north coast.

3.3.5 Summary

Catch results from sales slips for the 1987 WCVI troll season are compared to catch ceilings in Table 4. Chinook and coho exceeded their ceilings by 5.8% and 1%, respectively, however this was within the 7.5% deviation permitted by the Pacific Salmon Treaty. Outside trollers landed 17.1% of the Canadian Fraser River sockeye TAC or 6.1% greater than the 11.5% target allocation. The southwardly migrating pink salmon catch by outside trollers was 34.4% or 5.4% greater than the target allocation of 29%. Chum had no allocation, however, the 1987 WCVI troll catch was substantially less than previous years. Coho accounted for the largest WCVI salmon catch in 1987 at 1,821,022 pieces (Figure 12), followed by 644,688 pink, 498,383 sockeye, 378,931 chinook and 18,588 chum. The high catch rates of chinook, coho and sockeye meant an early troll closure and the shortest WCVI troll season on record.

3.4 WCVI TROLL GEAR COUNTS

Aerial counts of trollers fishing the WCVI were made throughout the 1987 season to assist in providing more timely estimates of troll effort which, in conjunction with CPE estimates obtained by dockside samplers and on-water "hails", were used to generate in-season estimates of troll catch. As in previous years, troll counts were obtained from Department of National Defence (DND) regularly scheduled tracker flights. These were supplemented with flights chartered by the Hook and Line Unit of South Coast Division to try to increase the timeliness and accuracy of in-season catch estimates. On occasions when poor weather prevented counting an area, radar counts were obtained of that area. Vessel counts from all sources are presented in Table 18.

3.5 PINK AND SOCKEYE TROLL TEST FISHING

Troll test fishing north of 49 degrees North (Figure 1) was conducted for a second year in 1987. The objectives were to assist in determining timing, stock composition and diversion rates[6] of pink and sockeye salmon runs. Bids to conduct the troll test charter were received from eight trollers of which four were selected. The Cayman Isle and the Janice-Ann fished Statistical Areas 11 and 111 while the Ruby Four and the Virgo fished Areas 125 to 127. Segregation of vessels into these two regions was necessary for determination of diversion rates. One observer was placed on each vessel to keep records, sample fish and radio information daily to South Coast Division. Vessels fished six

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[6] Diversion rate is the proportion of pink or sockeye returning via Johnstone Strait relative to those returning through both Johnstone and Juan de Fuca Straits.

lines, 10 to 17 hooks per line with "red gear". For stock identification scales were taken from sockeye (1 scale per fish; up to 240 sockeye per vessel per week) and pinks were sampled for post-orbital fork length and muscle tissue (up to 150 pinks per vessel per week). Charter duration was July 6 to August 4 (note, pink and sockeye retention for commercial trollers commenced August 7). On July 22 and July 31 the Cayman Isle and Janice-Ann, respectively, were moved to Statistical Areas 125-127 owing to poor catch rates in Areas 11-111 which were resulting in rapidly increasing survey costs.

Run Timing

Daily catch, effort, Statistical Area and hours fished for each test vessel are found in Tables 19 through 22. Table 23 summarizes sockeye and pink catch and effort by Statistical Area. Daily catches of sockeye and pink salmon per vessel were low in Areas 11 and 111 during the test fishery. The largest daily catch was 19 sockeye and 106 pink by the Janice-Ann on July 26 (Table 20). Catches were larger in Areas 125 to 127 but were inconsistent from day to day. The largest daily catch from these Areas was 223 sockeye on August 1 and 260 pinks on July 26, both by the Virgo (Table 22).

Run timing and abundance of pink and sockeye are reflected in catch per effort (CPE) patterns (Figures 16 and 17, and Table 24). CPE of sockeye (Figures 16) remained low in Areas 11, 111 and peaked at 1.3 sockeye per hour on July 26. In Areas 125 to 127 sockeye CPE first peaked on July 17 at 5.6 sockeye per hour and again on August 1 at 8.3 sockeye per hour. These two peaks may represent two pulses of sockeye moving through the vicinity of the test vessels. The decline of CPE on August 4 was more the result of the movement of test vessels toward delivery sites than fish availability. Pink CPE (Figure 17) from Areas 11 and 111 followed a lower but similar pattern to pink CPE from Areas 125 to 127. Maximum CPE's were 7.4 pink per hour on July 26 for Areas 11, 111 and 13.5 pink per hour on July 25 for Areas 125-127. The paralleling of CPE for these two regions suggests that pink stocks arrived and moved through the two test fishing regions at similar times.

Age and Stock Composition Analysis

Age composition of sockeye from the 1987 troll test fishery is given in Table 25 (estimates of age and stock composition provided by the Pacific Salmon Comm.). Of the 761 samples analyses 69% were 4_2 (four year old fish that emigrated to the ocean in their second year) and 24% were 5_2 (five year old fish that emigrated to the ocean in their second year).

Stock composition of sockeye from the 1987 troll test fishery are presented in Table 26. Samples prior to July 21 were primarily of non-Fraser origin (range = 73% to 86%). From July 25 on, 86% to 98% of sockeye samples were of Fraser origin, primarily Chilco River (26%-30%), Stellako River (15%-29%) and Adams/Lower Shuswap (3%-31%) runs.

Racial analyses of pink salmon from test and commercial fishing vessels (Table 27) indicate that in NWVI non-Fraser and Puget Sound fish were most abundant until week ending August 1. After this date Fraser pinks were more abundant in NWVI(70-73% of the pink catch). In SWVI Fraser pinks were abundant in the week ending July 25 but then sharply declined until the week ending August 15 when they once again constituted the major proportion of available pinks. Stock composition estimates were provided by the Pacific Salmon Commission.

Diversion Rates

Investigations by English et al. (1988) suggest that troll catch and effort data may provide an in-season index of sockeye and pink diversion rates. This knowledge would be useful in assessing the quantity of sockeye and pink salmon available to the West Coast fishery. In 1987 catch and effort data from the troll test fishery were used to calculate cumulative daily diversion rates of sockeye and pink salmon.

Cumulative daily diversion rates (Figure 18 and Table 28) stabilized after about 15 days of data (July 20). On July 30 (the last day when calculations were possible) cumulative diversion rates were 11% for sockeye and 19% for pink. This suggests that at the onset of the pink and sockeye troll fishery, roughly 90% of sockeye and 80% of pink presently in South Coast waters would be available to the west coast fishery. Diversion rate estimates from sales slips during pink and sockeye retention (Table 29) were higher than from the test fishery. Sales slip estimates averaged 27% for sockeye and 44% for pink. Pre-season predictions projected a 40% diversion rate for sockeye and 38% to 43% for pink (D. Blackbourn per. comm., 1987). Analysis by the Pacific Salmon Commission (1988) found a strong increase in diversion rate of sockeye after August 2-8 and a decrease by August 22. Therefore, the comparison of test fishery results with the larger sales slip diversion rates likely reflected an actual shift in sockeye and pink migration to the north route (i.e. via Johnstone Strait) after July 30.

3.6 WEST COAST VANCOUVER ISLAND SUBLEGAL SAMPLING PROGRAM

In 1987 South Coast Division initiated a two year program

to collect information on sublegal[7] chinook and coho caught by West Coast Vancouver Island and Strait of Georgia trollers. The objectives were to determine release rates of sublegal chinook and coho in the troll fishery as well as their size, age and sex distributions. This section presents the results from West Coast Vancouver Island trollers participating in this program. Discussion will be restricted to the reporting of results leaving analyses to future years when a larger and consequently more reliable sample base has been achieved.

Three West Coast Vancouver Island troll vessels, the "Green Sea," the "Cowichan" and the "B.C. Tuna" were commissioned by DFO to participate in this program during the normal course of their commercial fishing. Program duration was July 1 to August 23. Data collection and sampling procedures were performed as in the Strait of Georgia sublegal sampling program (see section 2.5). Additional sex, length and scale samples of sublegal chinook and coho were obtained from the pink and sockeye troll test vessels (Section 3.5).

To assess how well catches by fishermen participating in the program represented the troll fishery the proportion of each species caught relative to the total catch, and the average catch per day (CPE) for each species were compared with WCVI troll landings from sales slips (Table 30). "Sublegal" fishermen had slightly lower CPE's for all species and the proportion of each species caught were very similar relative to sales slip landings. These differences are not surprising considering the small number of vessels involved, areas fished, and proportion of total catch sampled by the sublegal program.

Numbers of adult salmon kept plus sublegals released or sampled by trollers involved in the WCVI Sublegal Program are illustrated in Table 31. Catch rates of sublegal chinook (Figure 19) were generally lower in NWVI (seasonal average = 0.3 sublegal chinook caught per hour) relative to SWVI (seasonal average = 1.2 sublegal chinook caught per hour). Weekly catches of sublegal chinook remained relatively constant in NWVI whereas in SWVI they increased after statistical week 7/5. Average weekly catches of sublegal coho per hour (Figure 20) displayed trends similar to chinook. The seasonal average for NWVI was 0.04 sublegal coho caught per hour compared with 0.40 per hour for SWVI. In SWVI the catch rate of sublegal coho increased substantially after

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[7] Sublegal chinook refers to those less than the minimum size limit (62 cm fork length for the Strait of Georgia and 67 cm fork length for WCVI). Sublegal coho are those less than 48 cm fork length except during July 1 to August 31 when it is those less than 30 cm fork length. Released fish in this section <u>does not</u> refer to adult "shakers" during non-retention periods.

statistical week 7/4.

Percentages of total chinook and coho catches that were sublegals for each statistical week are displayed in Figures 21 and 22, respectively. For the chinook catch the percentage that were sublegal tended to be lower in NWVI than in SWVI and for both regions tended to increase as the season progressed (Figure 21). Of the total chinook caught roughly 25% in NWVI and 45% in SWVI were sublegal. Percentages of the coho catch that were sublegal were substantially lower than for chinook (Figure 22). Of the total seasonal coho catch about 1% were sublegal in NWVI and about 4% were sublegal in SWVI.

The percentages of sublegal chinook and coho at each age from NWVI and SWVI samples are given in Table 32. For sublegal chinook three year olds were most abundant, followed by two year olds, and then four year olds. With samples from all months combined age three's composed 75% of NWVI samples and 82% of SWVI samples. For sublegal coho, all months combined, two year olds were most abundant in NWVI samples (74%) while three year olds were most abundant in SWVI samples (74%). Sample sizes are too small to make useful comparisons for NWVI in August and for SWVI in July.

Mean fork lengths of sublegal chinook and coho at each age are given in Table 33 and 34, respectively.

Percentages of sublegal male and female chinook and coho are shown in Table 35. For chinook 65% of NWVI samples and 51% of SWVI samples were males. For coho 81% of NWVI samples and 57% of SWVI samples were males. In the case of coho the high proportion of males may be owing to misidentification of sex. A number of sublegal coho caught had undeveloped gonads that fishermen assumed to be males. Future Sublegal Sampling Programs should have a portion of the sublegal catch returned in the round so that biological staff can determine sex.

Percentage of sublegal chinook caught with marks (i.e. missing an adipose fin) was 4% in NWVI and 6% in SWVI. For sublegal coho caught 2% from NWVI and 5% from SWVI were marked. Analysis of coded wire tags from adipose clipped sublegal chinook and coho will be presented in the reporting of the 1988 Sublegal Sampling Program.

4.0 JOHNSTONE STRAIT TROLL

Fishing in Johnstone Strait is mainly by net gear. Therefore, as in previous years, troll management actions in 1987 were dictated by concerns for net species and net fleet activities. Consequently, Johnstone Strait trollers were not assiwed catch ceilings, but rather had their Johnstone Strait catches assigned to other catch ceilings. For example, chinook caught in Areas 111 and

11 were assigned to the North Coast catch ceiling, chinook caught in Area 12 to the WCVI ceiling, and chinook caught in Area 13 to the Strait of Georgia catch ceiling. One anomaly, was that in 1987 the chinook troll catch from Area 12 was given a ceiling of 5,000 pieces. Assignment of species to catch ceilings were as follows:

Stat. Area	Chinook	Coho	Pink	Sockeye	Chum
111,11	North Coast	No Ceiling	WCVI	WCVI	WCVI
12	WCVI	No Ceiling	WCVI	WCVI	WCVI
13	Georgia Strait	No Ceiling	Georgia Strait	Georgia Strait	Georgia Strait

Table 36 summarizes the management actions taken in the 1987 Johnstone Strait troll fishery. Trolling was permitted from July 1 to August 23. Catch results from sales slip records are shown in Table 37. Coho accounted for the largest salmon catch in 1987 at 126,704 pieces, followed by 71,404 pink, 22,873 sockeye, 2,516 chum and 1,780 chinook. The chinook catch (from Area 12) was 63% less than the allocation of 5,000 pieces. Cumulative weekly sales slip catches showed that pink and coho catches accumulated faster than other species (Figure 23), although the total catch of pink was lower than coho owing to a shorter pink fishing season (statistical weeks 8/1 to 8/3).

5.0 SUMMARY

For the third year in a row the troll fishery in southern B.C. was intensively managed during the 1987 season. This was largely a result of the terms of the Pacific Salmon Treaty, ratified by Canada and the United States in 1985. DFO developed management plans in consultation with industry prior to and during the season. Management actions included a new minimum size limit for WCVI chinook, area closures and periods of non-retention for certain salmon species and fisheries. The purpose of most of these actions was to keep troll harvests within specified catch ceilings in three areas: Strait of Georgia, West Coast of Vancouver Island and Johnstone Strait.

In Georgia Strait, trolling occurred from July 1 to September 30, which was similar to historic times. Four additional days in October and November were provided for a chum only fishery. Trolling on the WCVI and Johnstone Strait occurred from July 1 to August 23. For WCVI this was the shortest season on record.

Catches of sockeye and pink in Georgia Strait were 2.9% of the Canadian TAC and 3.6% of the South Coast TAC, respectively. These were within permissible range of the allocations specified by the Minister of Fisheries. The chinook catch, however, fell short of the ceiling by 23% reflecting continued low abundance of chinook in the Strait of Georgia. For WCVI chinook and coho, catch ceilings were exceeded but were within the 7.5% deviation permitted by the Pacific Salmon Treaty. Outside trollers landed 17.6% of the Canadian TAC of Fraser River sockeye or 6.1% greater than their allocation of 11.5%. Pink salmon catch by outside trollers was 34.6% or 5.6% greater than the target allocation of 29% of southerly migrating pink salmon. In Johnstone Strait catches were assigned to WCVI, Strait of Georgia or North Coast fisheries depending on the species and Statistical Area of the catch.

6.0 ACKNOWLEDGEMENTS

The authors wish to thank C. McConnell and the staff of the South Coast hook and line unit for their assistance in preparing data summaries. In addition, J. Gable and J. Cave of the Pacific Salmon Commission provided analysis of sockeye scale data.

7.0 LITERATURE CITED

Argue, A.W., M.P. Shepard, T.F. Shardlow and A.D. Anderson. 1987. Review of salmon troll fisheries in southern British Columbia. Can. Tech. Rep. Fish. Aquat. Sci. 1502: 150 p.

English, K.K., W.J. Gazey, T.F. Shardlow and M. Labelle. 1988. Development of troll fishery management models for southern British Columbia. Can. Tech. Rep. Fish. Aquat. Sci. 1526: 79 p.

Pacific Salmon Commission. 1988. Report of the Fraser River Panel to the Pacific Salmon Commission on the 1987 Sockeye and Pink Salmon Fishing Season, August 1988.

Shardlow, T.F., A.D. Anderson and A.W. Argue. 1986. Review of 1985 south coast salmon troll fisheries. Can. MS. Rep. Fish. Aquat. Sci. 1895. 68 p.

Shardlow, T.F., T.G. Hoyt and A.D. Anderson. 1988. Review of 1986 south coast salmon troll fisheries. Can. Tech. Rep. Fish. Aquat. Sci. 1560: 99 p.

Shardlow, T.F. and L.D. Collicutt. 1989. Strait of Georgia sport fishery creel survey statistics for salmon and groundfish, 1987. Can. MS. Rep. Fish. Aquat. Sci. 2035: 62p.

Webb, T.M., K.K. English and W.J. Gazey. 1983 In-season chinook catch estimation. Report prep. under Dept. Supply Serv. contract to ESSA Ltd. and LGL Ltd. for Field Serv. Br., Dept. Fish. Oceans. 79 p.

Wong, F.Y.C. 1983. Historical salmon commercial catch data system of the Fisheries Research Branch, Department of Fisheries and Oceans, Pacific Region. Can. Tech. Rep. Fish. Aquat. Sci. 1156: 94 p.

FIGURES

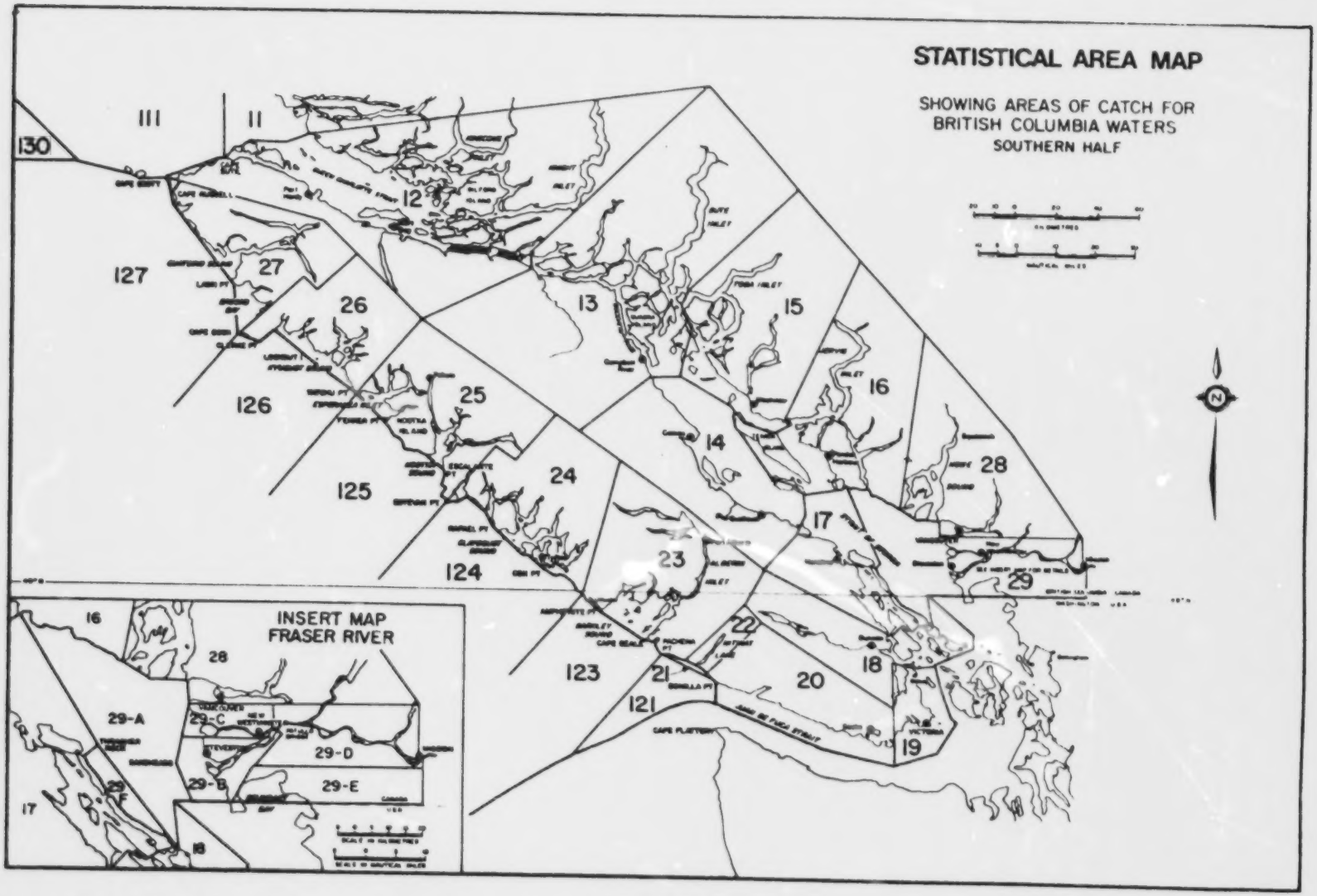


Figure 1. Statistical area map for Southern British Columbia.

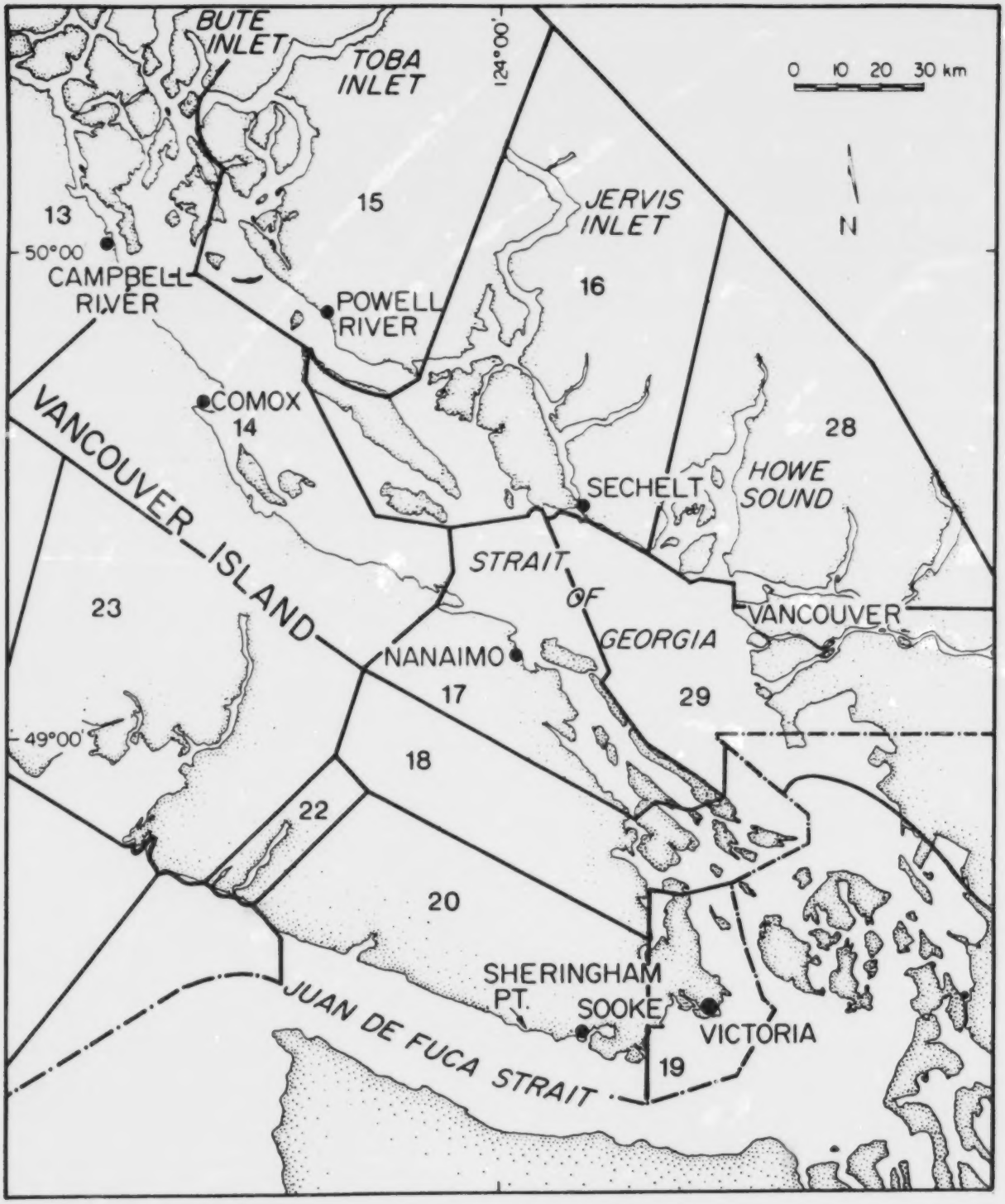


Figure 2. Statistical area map for the Strait of Georgia.

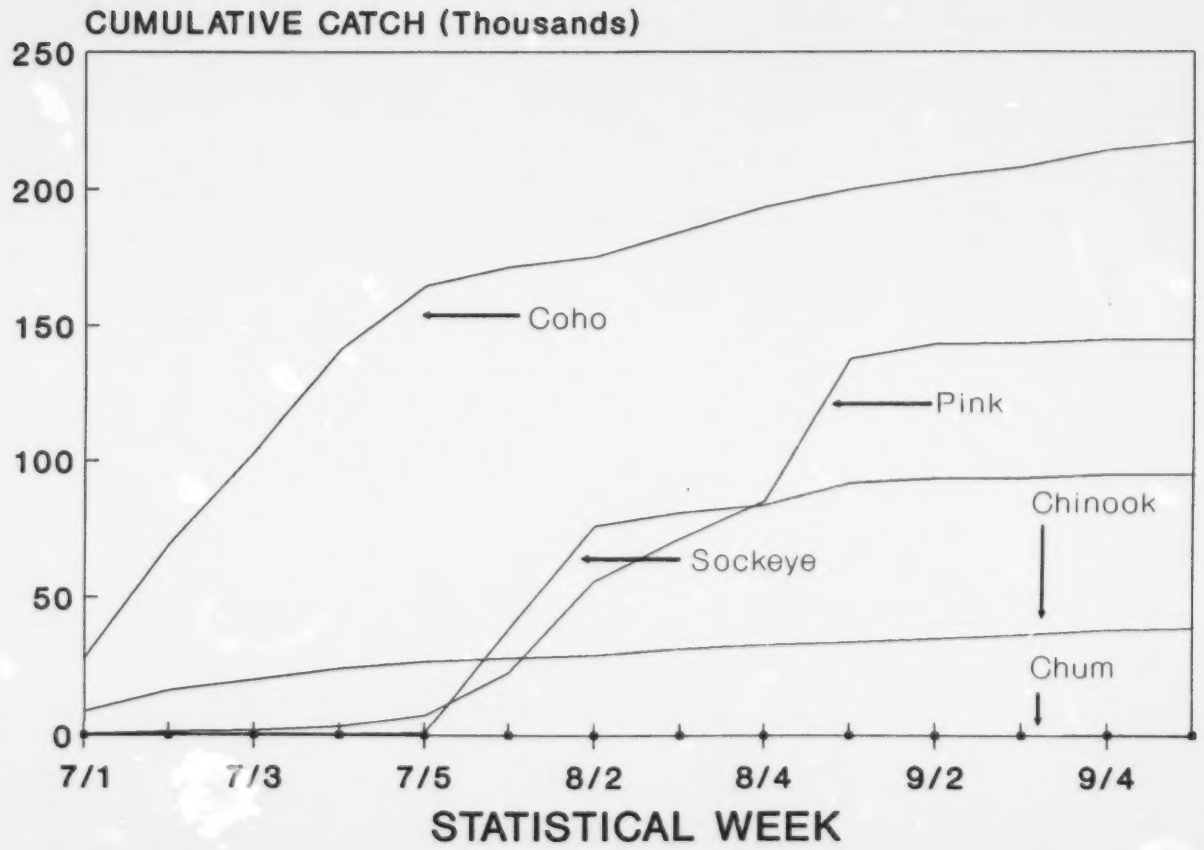


Figure 3. Cumulative weekly troll catches for the Strait of Georgia in 1987.

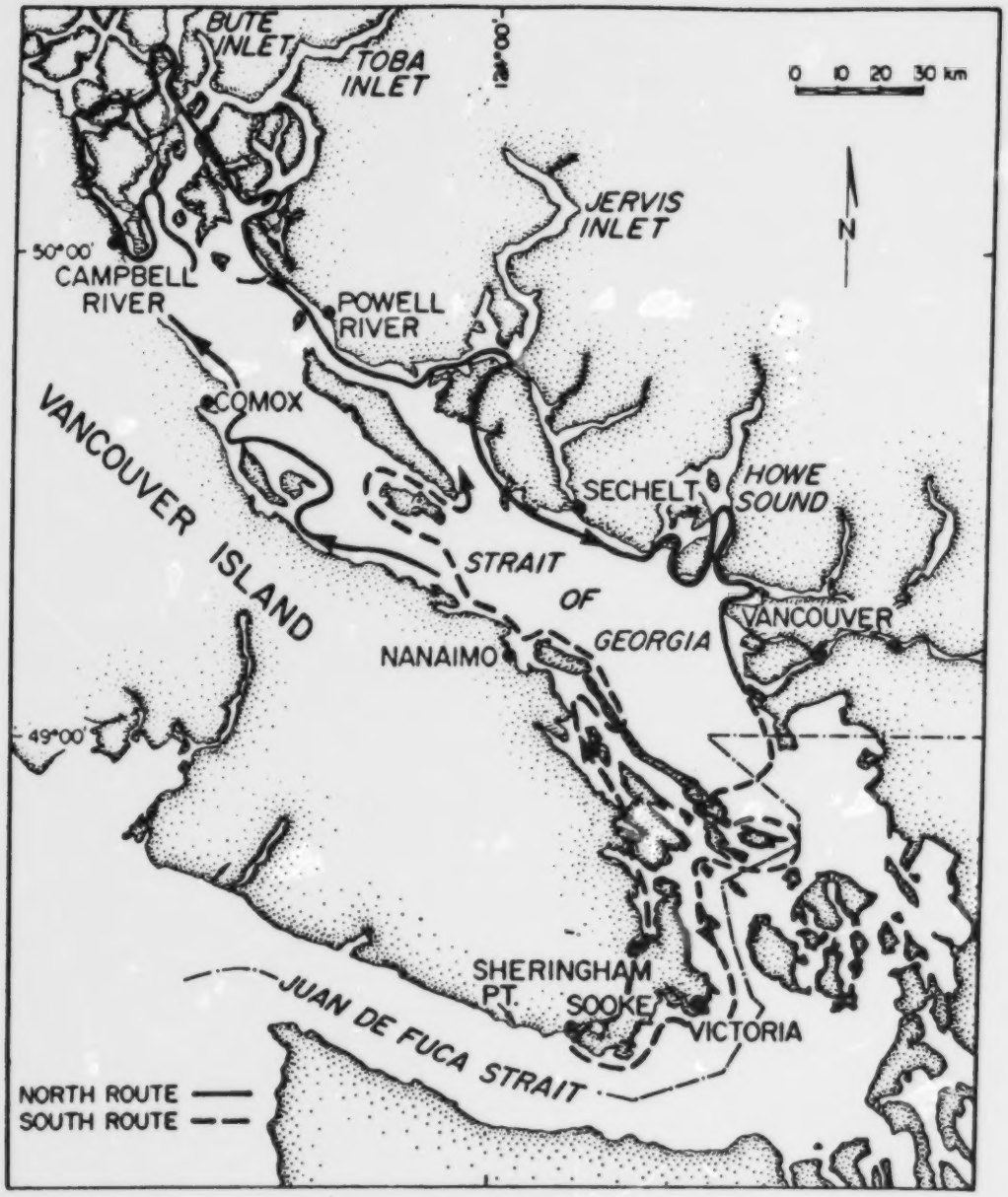


Figure 4. Strait of Georgia overflight routes.

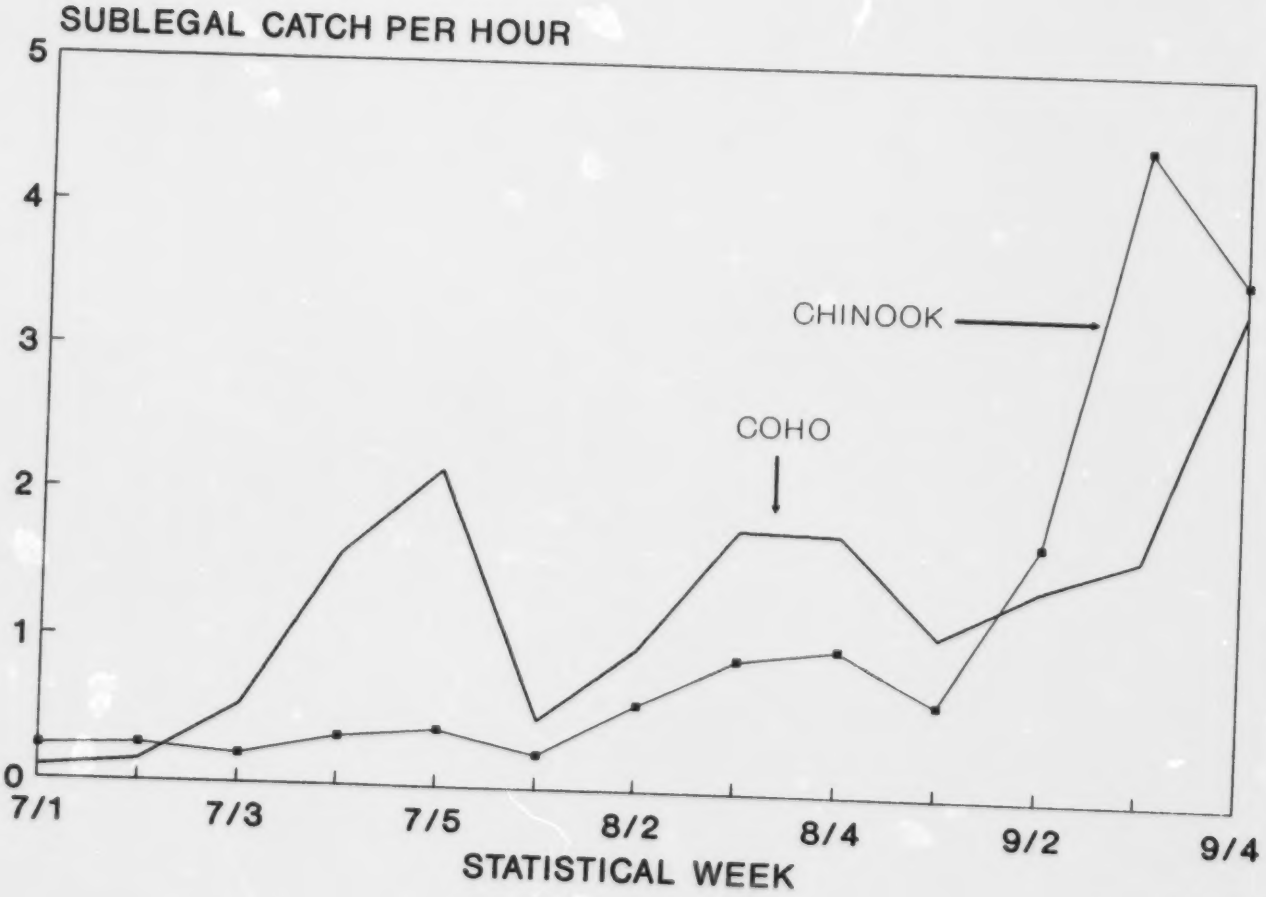


Figure 5. Average weekly catch rates of sublegal chinook and coho by participating trollers in Strait of Georgia - 1987.

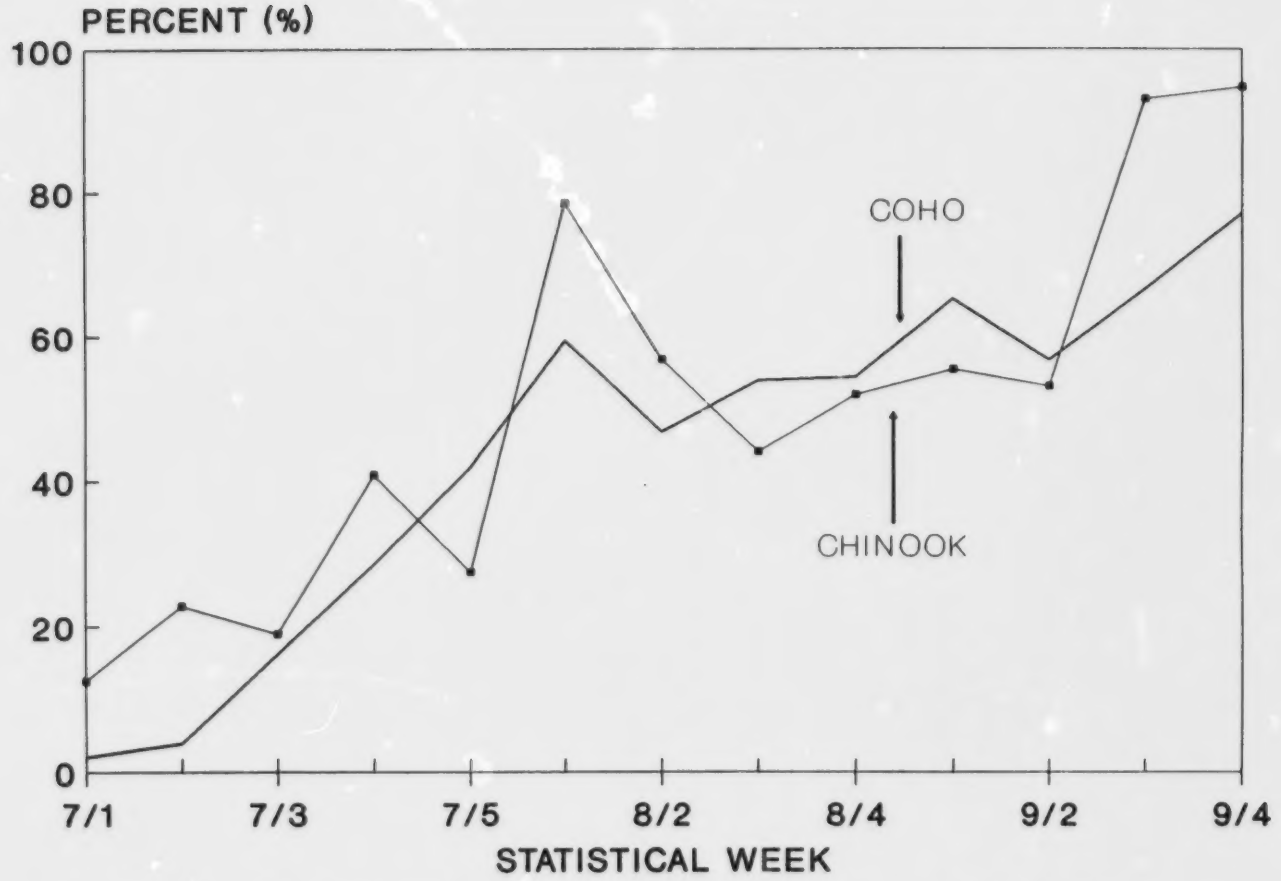


Figure 6. Weekly percentages of chinook and coho catches that were sublegals from the 1987 Strait of Georgia Sublegal Sampling Program.

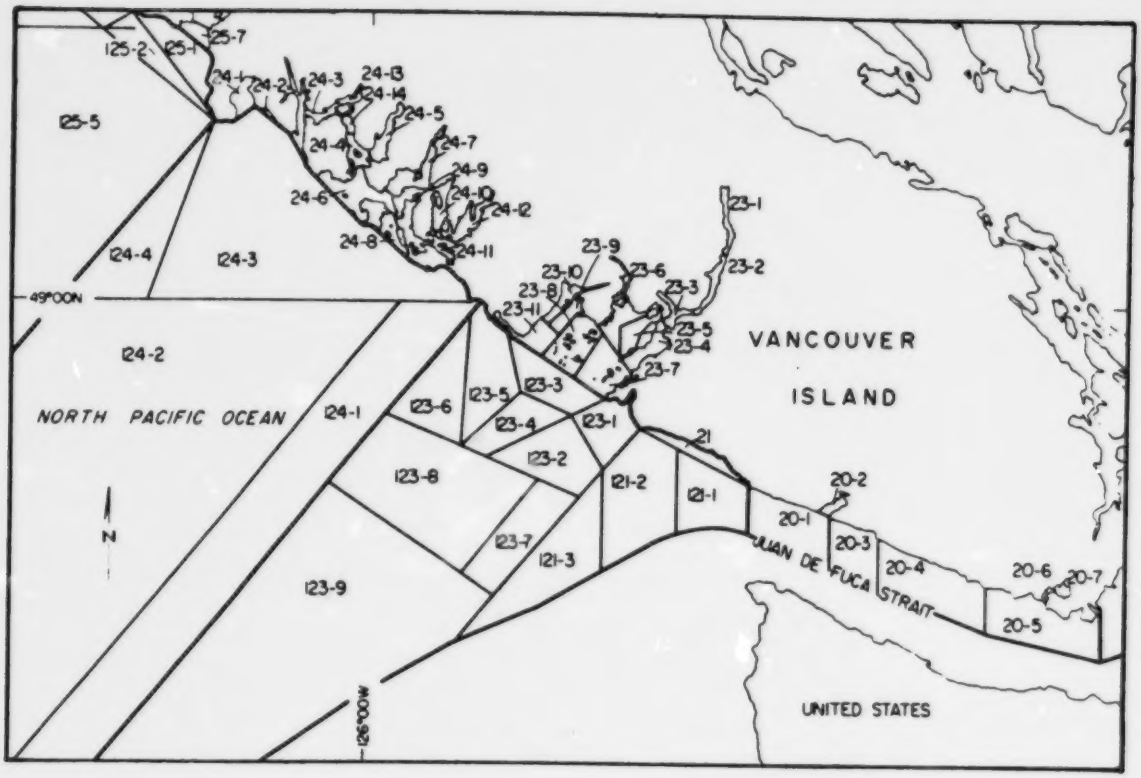


Figure 7. Management sub-areas for the south west Coast of Vancouver Island.

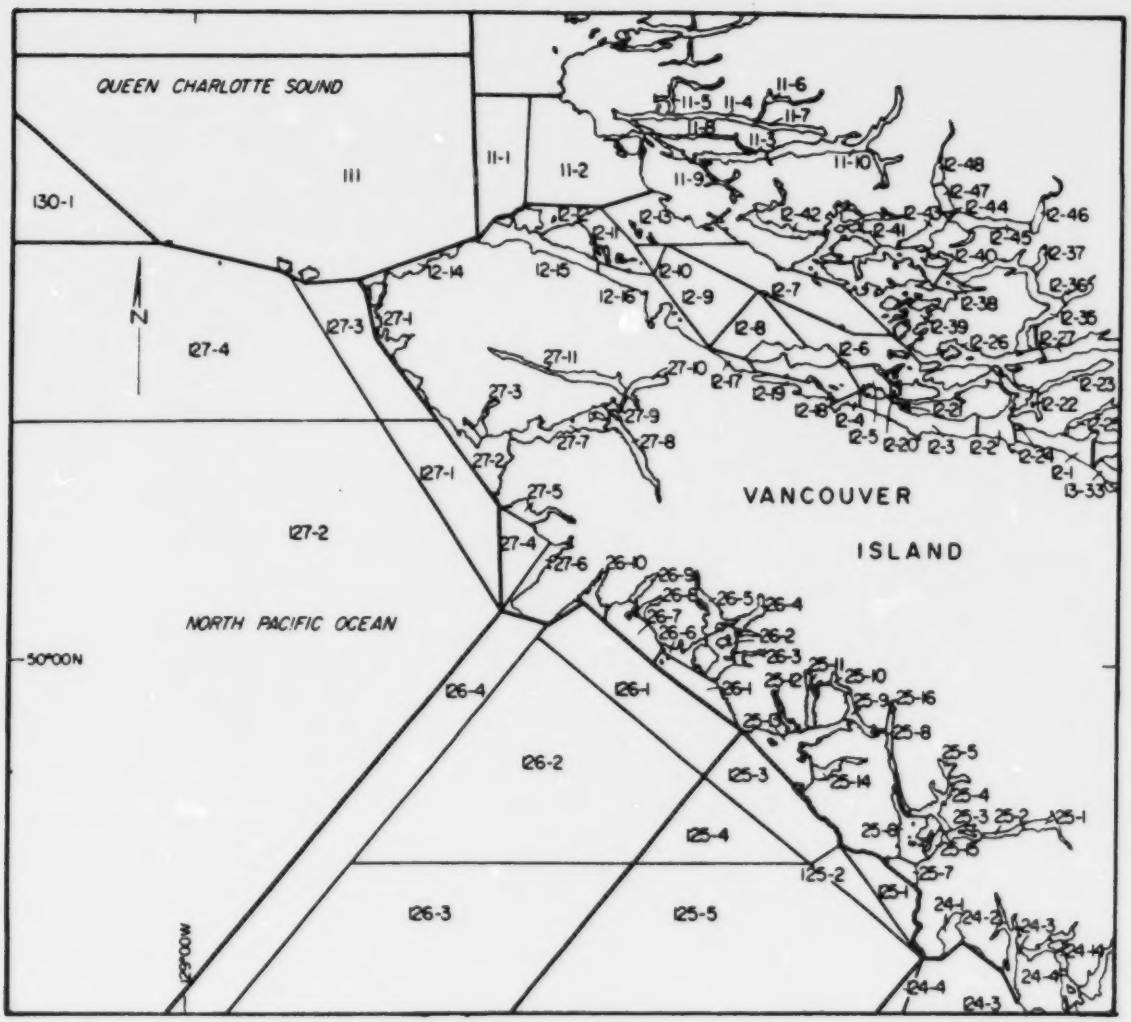


Figure 8. Management sub-areas for the north west Coast of Vancouver Island and Johnstone Strait.

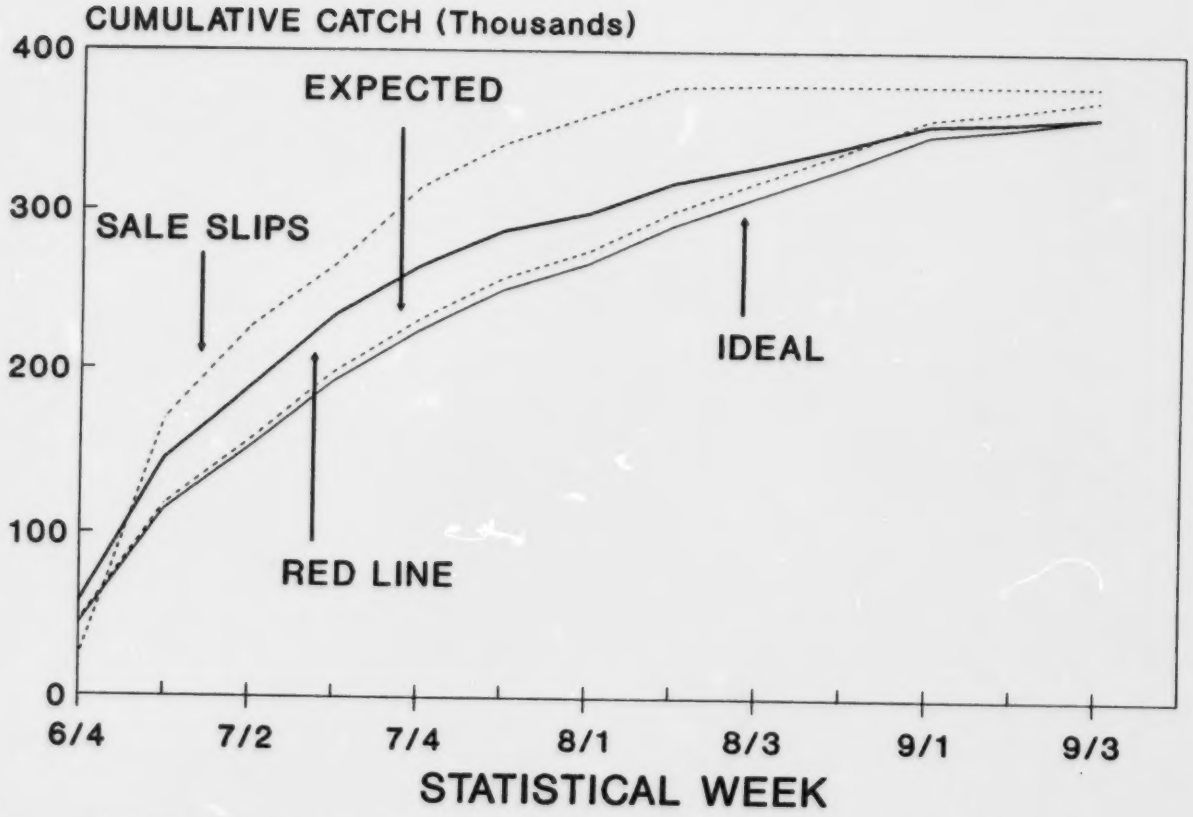


Figure 9. Comparison of cumulative weekly troll catches (sale slips and ideal) with the expected and red line catches for West Coast Vancouver Island chinook in 1987.

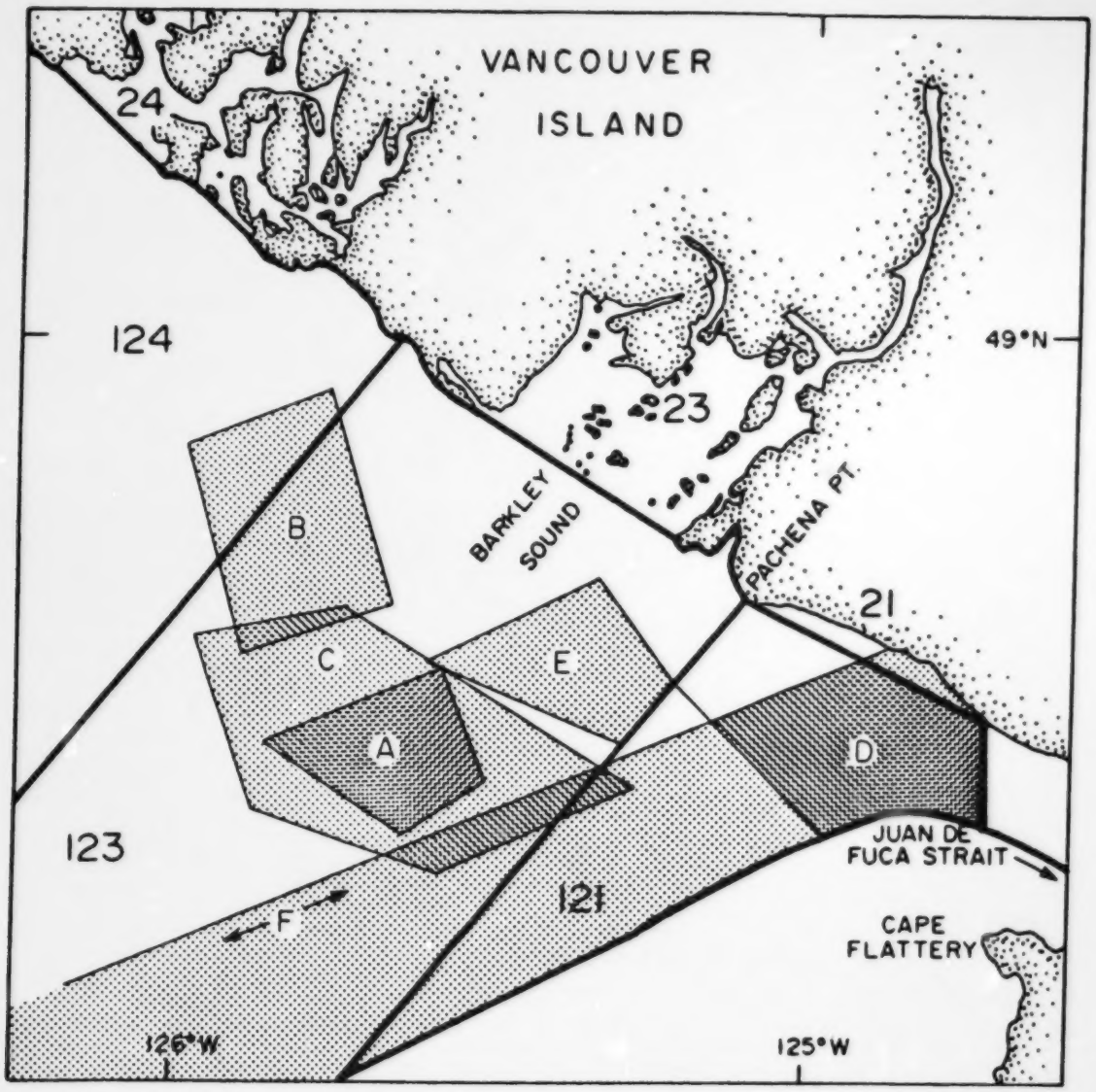


Figure 10. Potential area closures as proposed for 1987 by the Outside Troll Advisory Committee. (see Appendix 1 for details).

Key:

A. Chinook No. 1
B. The Wreck
C. Chinook No. 2
D. Swiftsure
E. 7-12 Mile
F. 980 Line (region below line)

Numbers refer to management areas

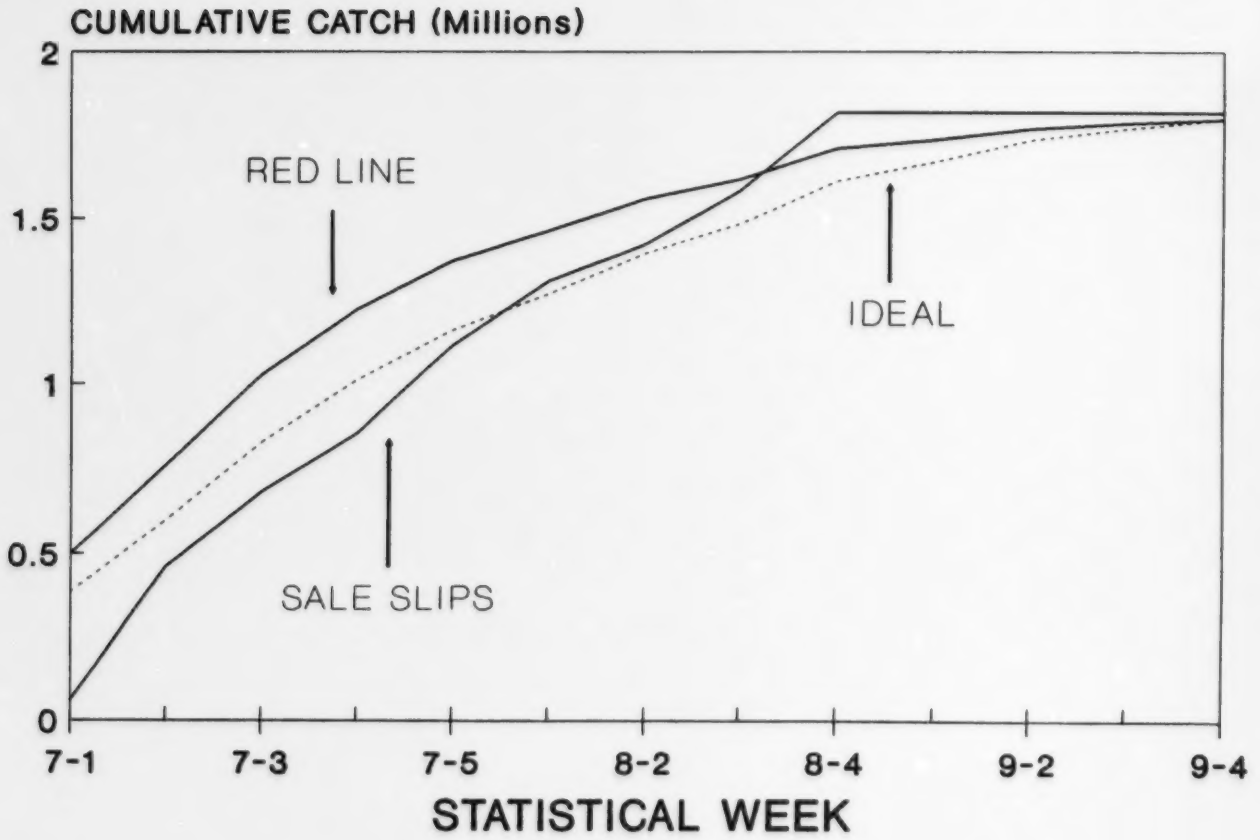


Figure 11. Comparison of cumulative weekly troll catches (ideal and sales slip) with red line catch for West Coast Vancouver Island coho in 1987.

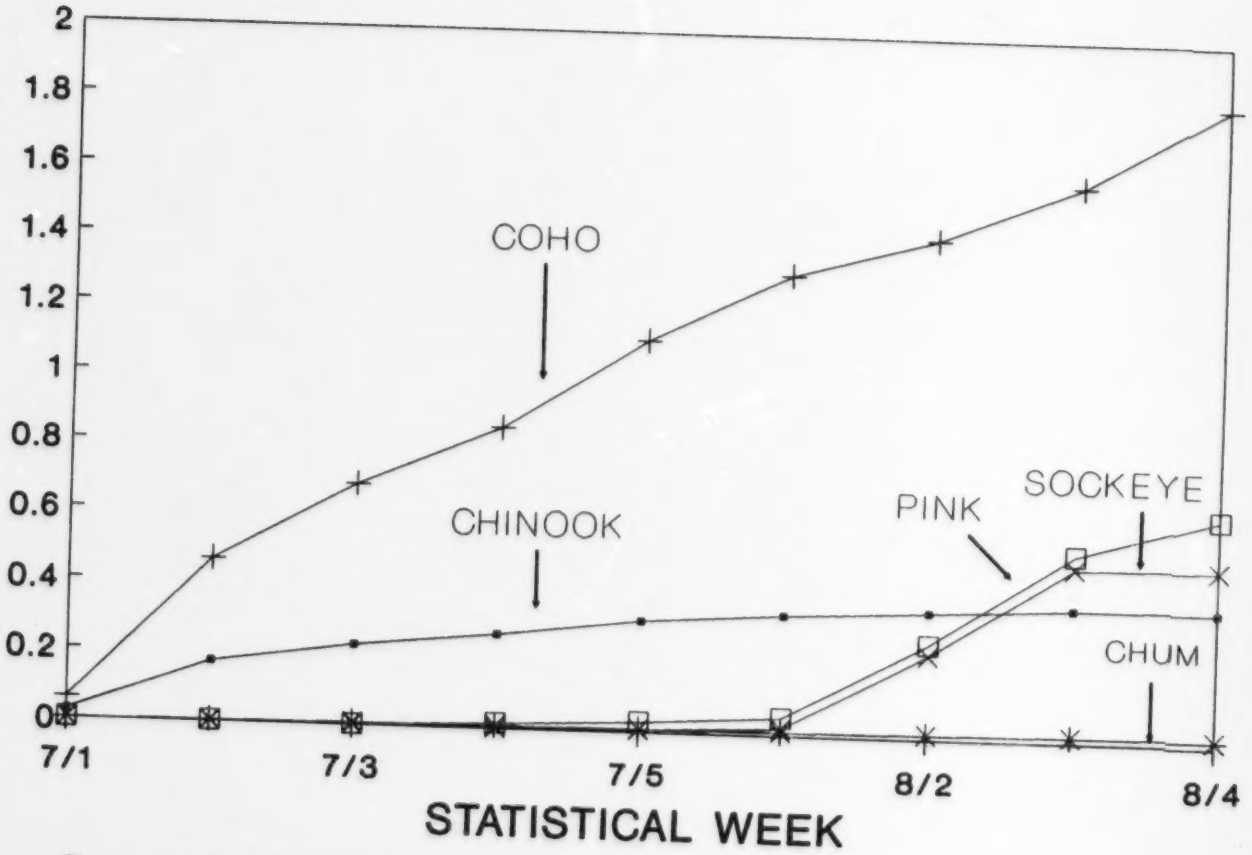


Figure 12. Cumulative weekly troll catches by species for West Coast Vancouver Island in 1987. Includes Johnstone Strait chum, pink and sockeye catches.

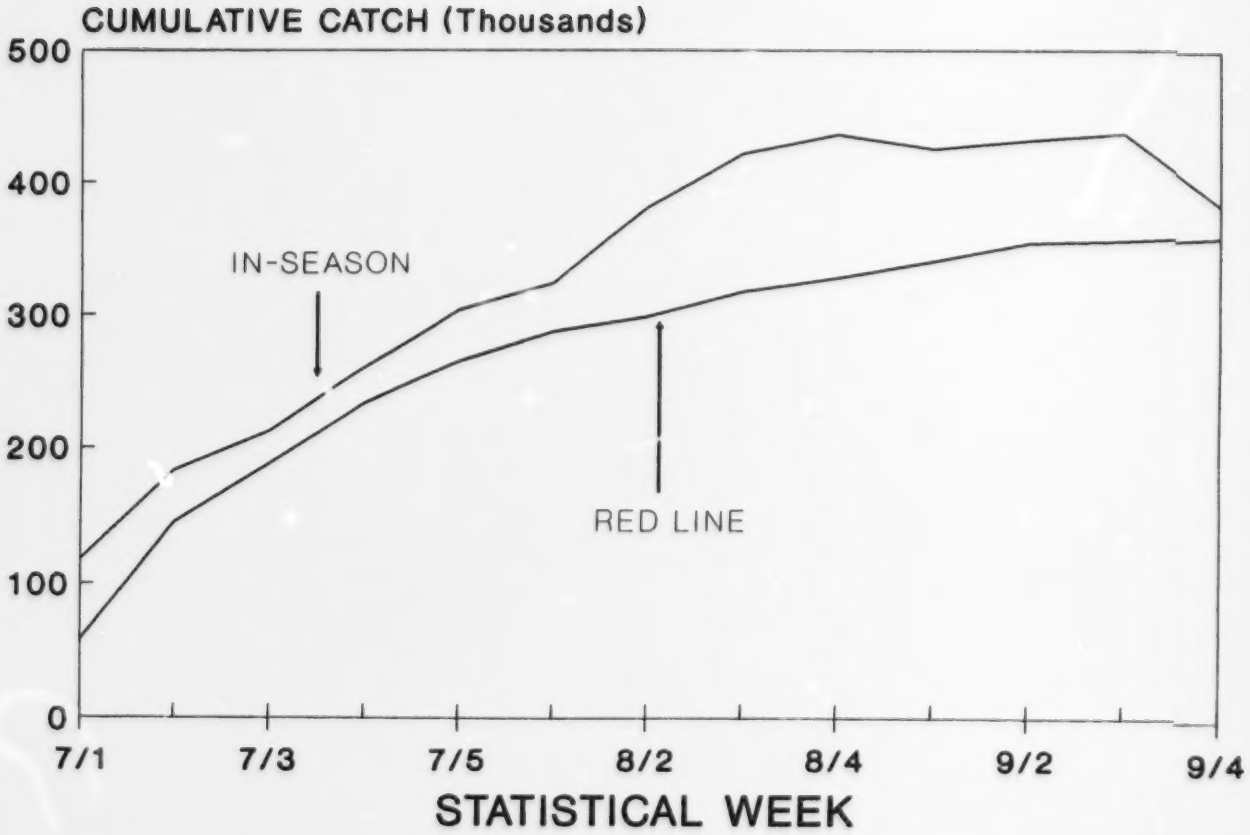


Figure 13. Comparison of cumulative weekly in-season and red line chinook troll catches for the West Coast Vancouver Island in 1987.

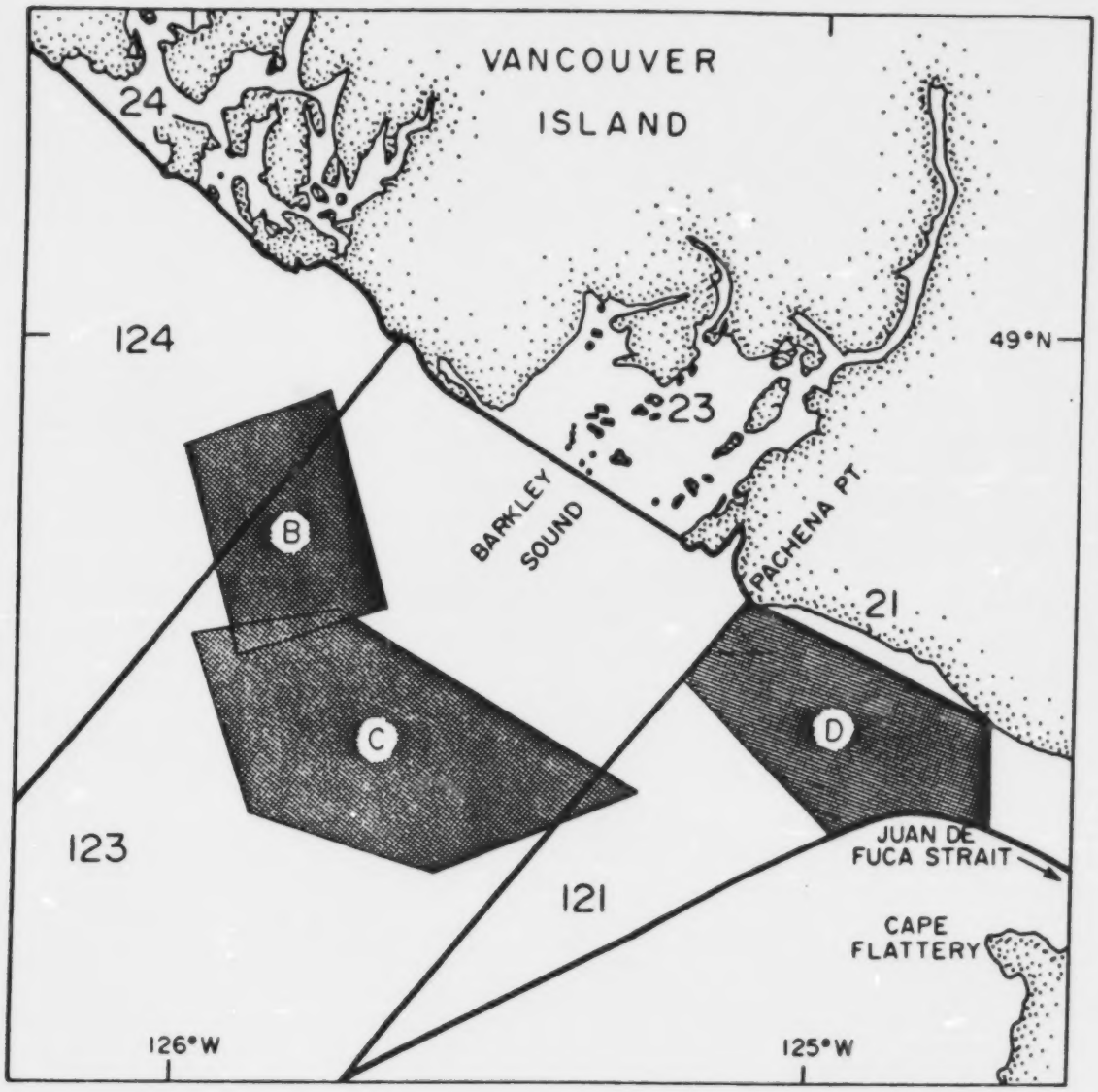


Figure 14. Area closures implemented in 1987.

Key:

B. The Wreck
C. Chinook No. 2
D. Swiftsure

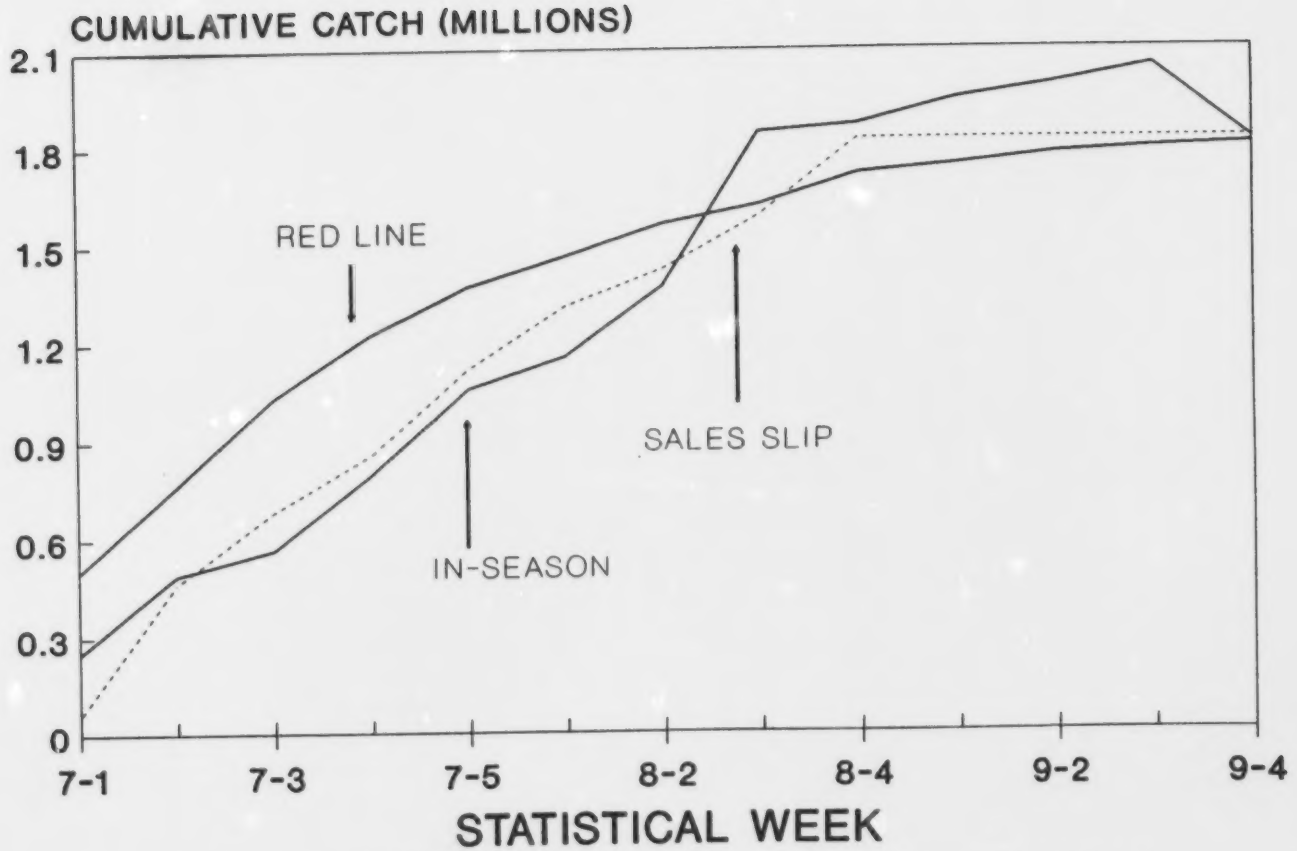


Figure 15. Comparison of cumulative weekly in-season and sales slip troll catches with red line catch for West Coast Vancouver Island coho in 1987.

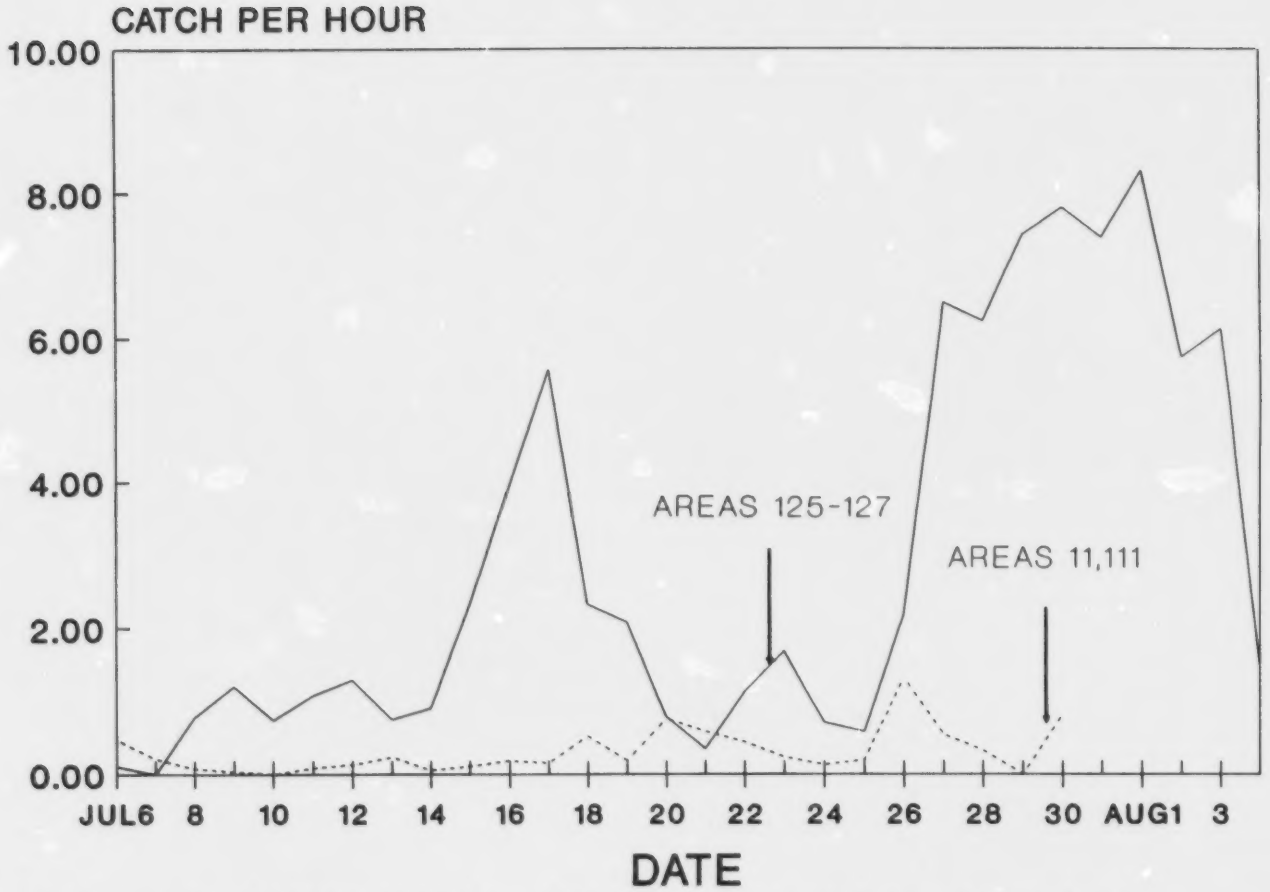


Figure 16. Comparison of weekly CPE of sockeye from Areas 11, 111 and 125 - 127 based on 1987 pink and sockeye troll test fishing.

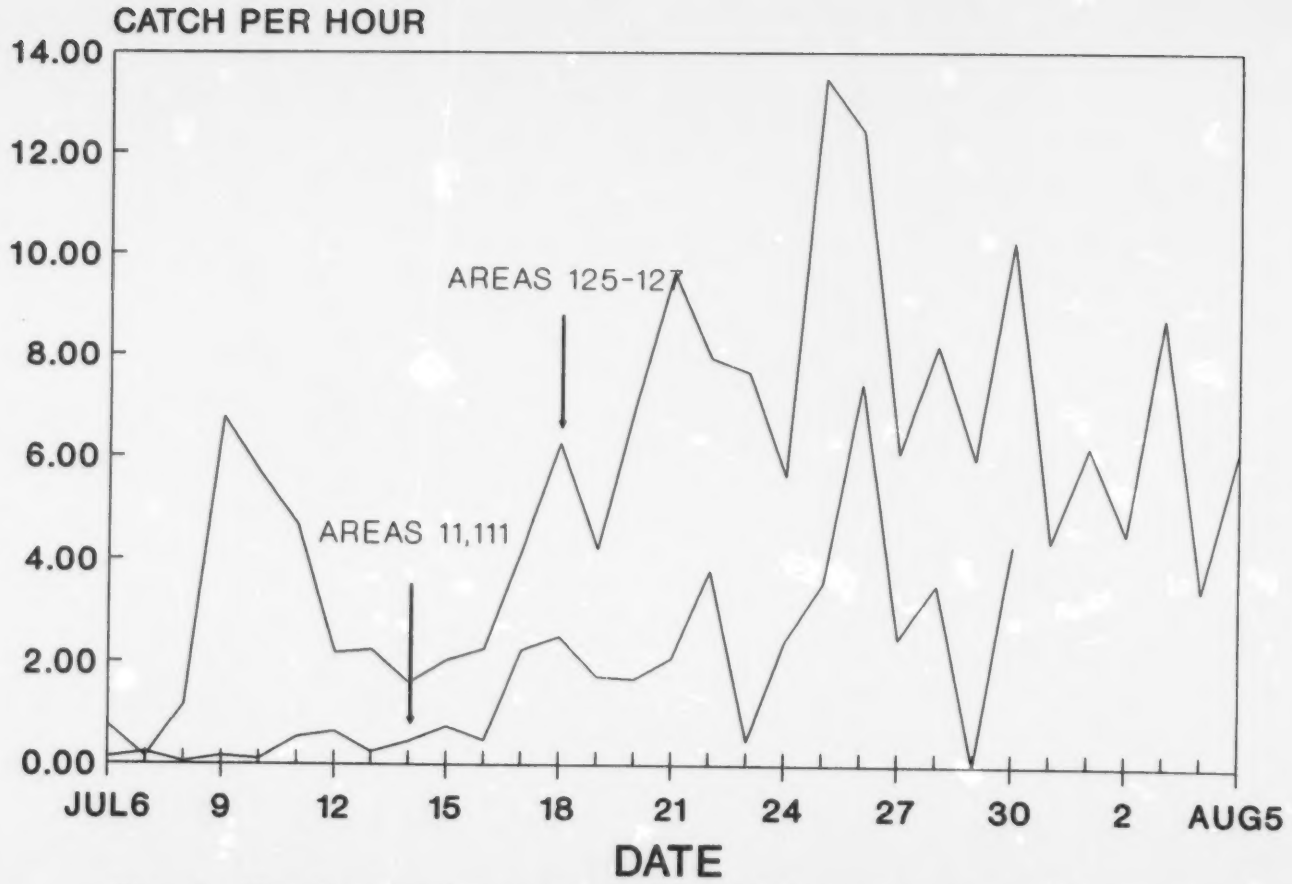


Figure 17. Comparison of weekly CPE of pink from Areas 11, 111 and Areas 125-127 based on 1987 pink and sockeye troll test fishing.

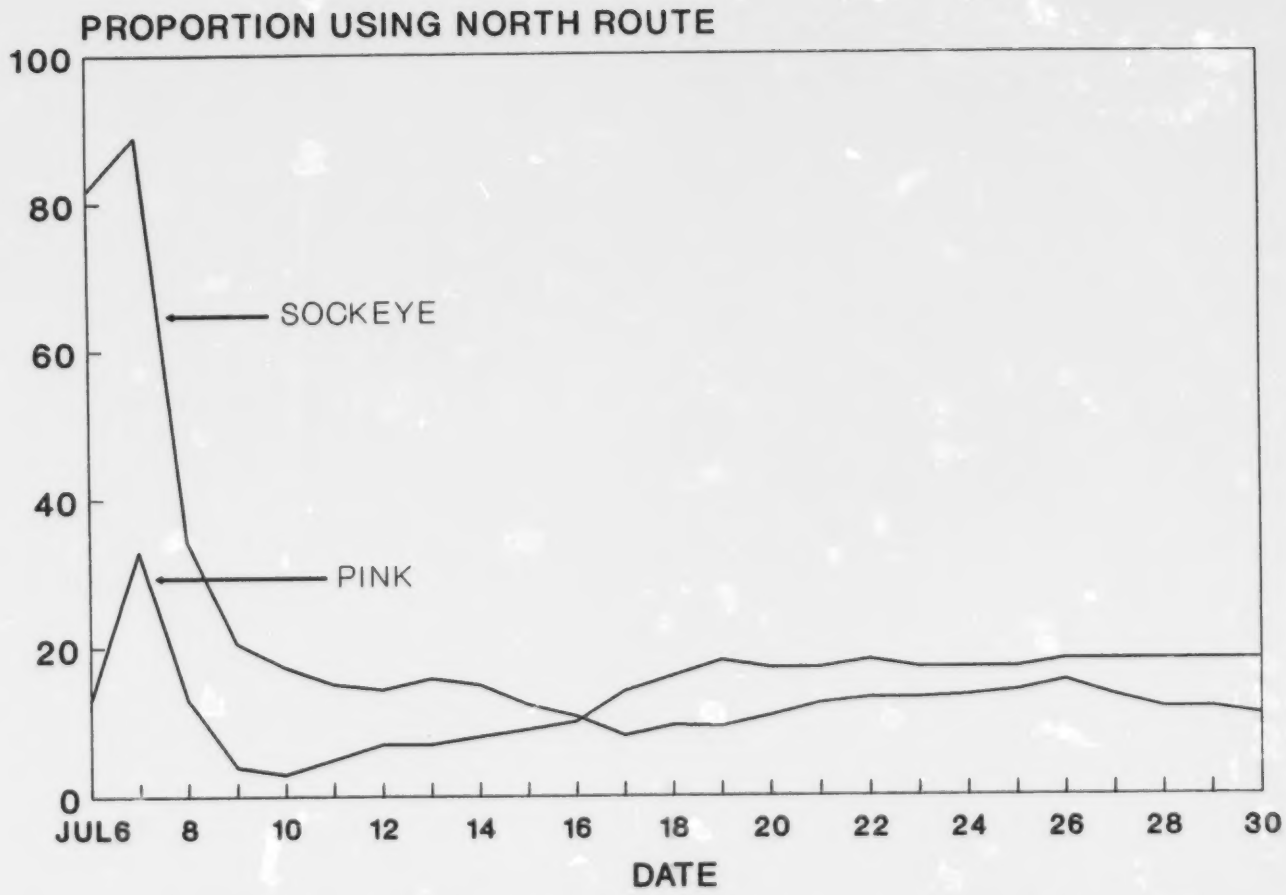


Figure 18. Cumulative daily diversion rate of sockeye and pink based on 1987 pink and sockeye troll test fishing.

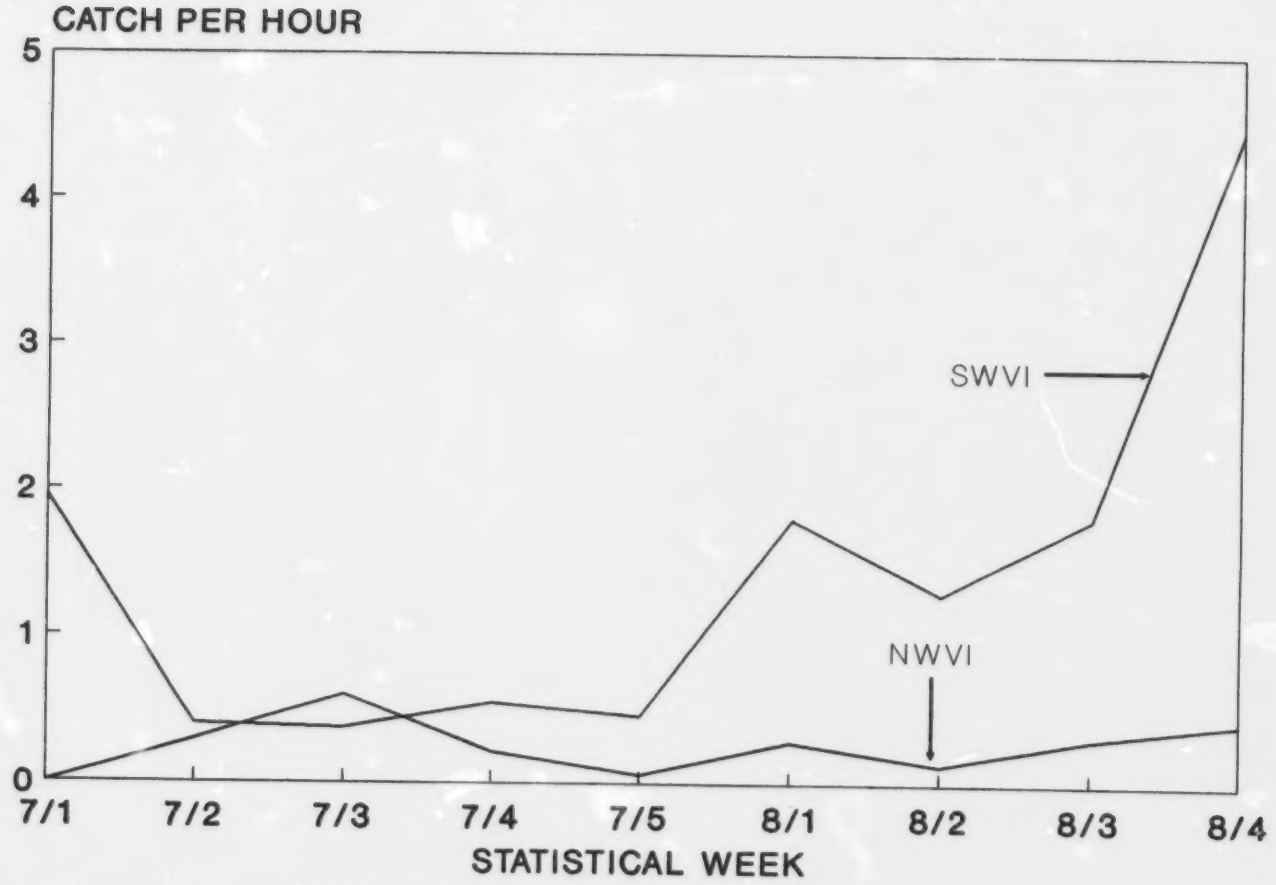


Figure 19. Average weekly catch rates of sublegal chinook by trollers participating in the 1987 West Coast Vancouver Island Sublegal Sampling Program.

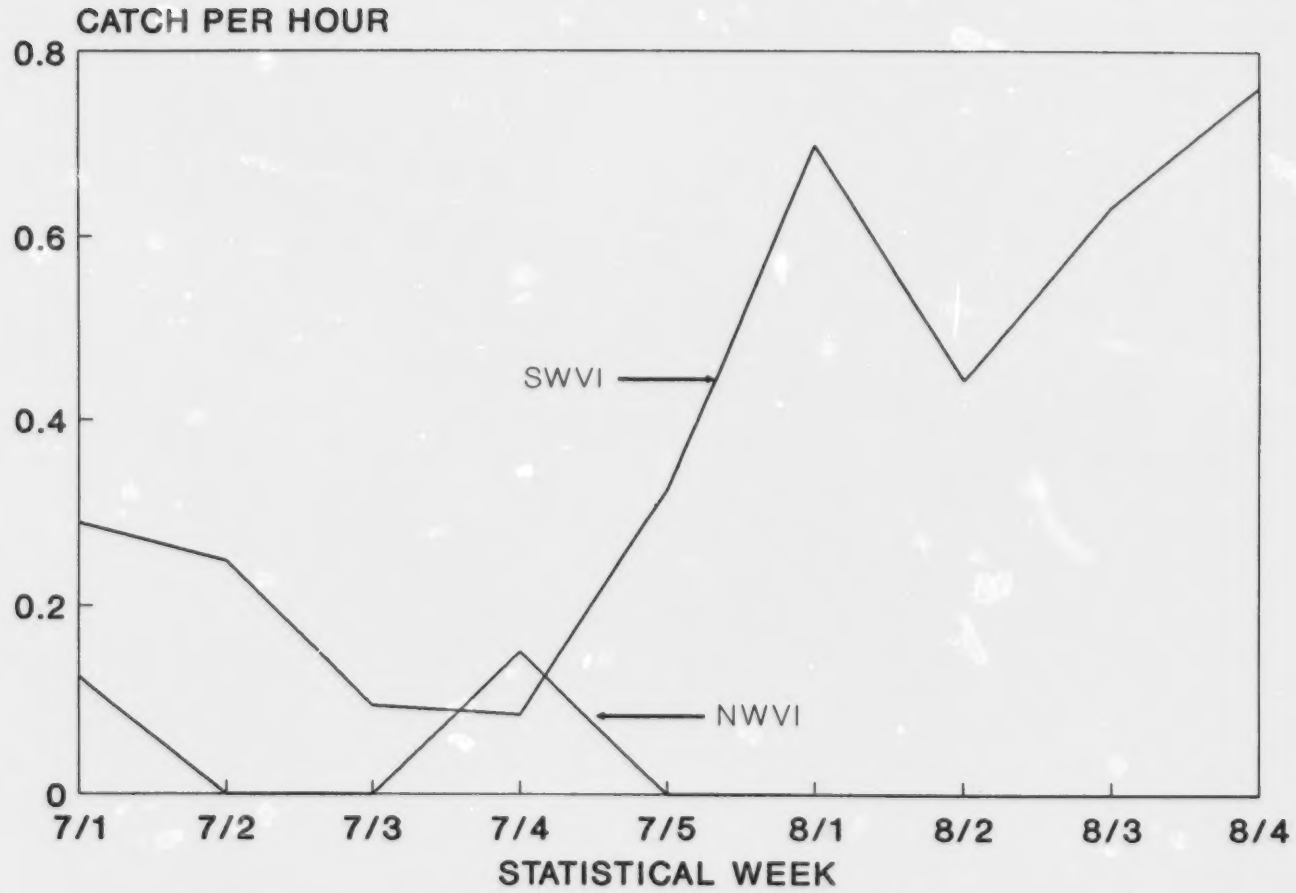


Figure 20. Average weekly catch rates of sublegal coho by trollers participating in the 1987 West Coast Vancouver Island Sublegal Sampling Program.

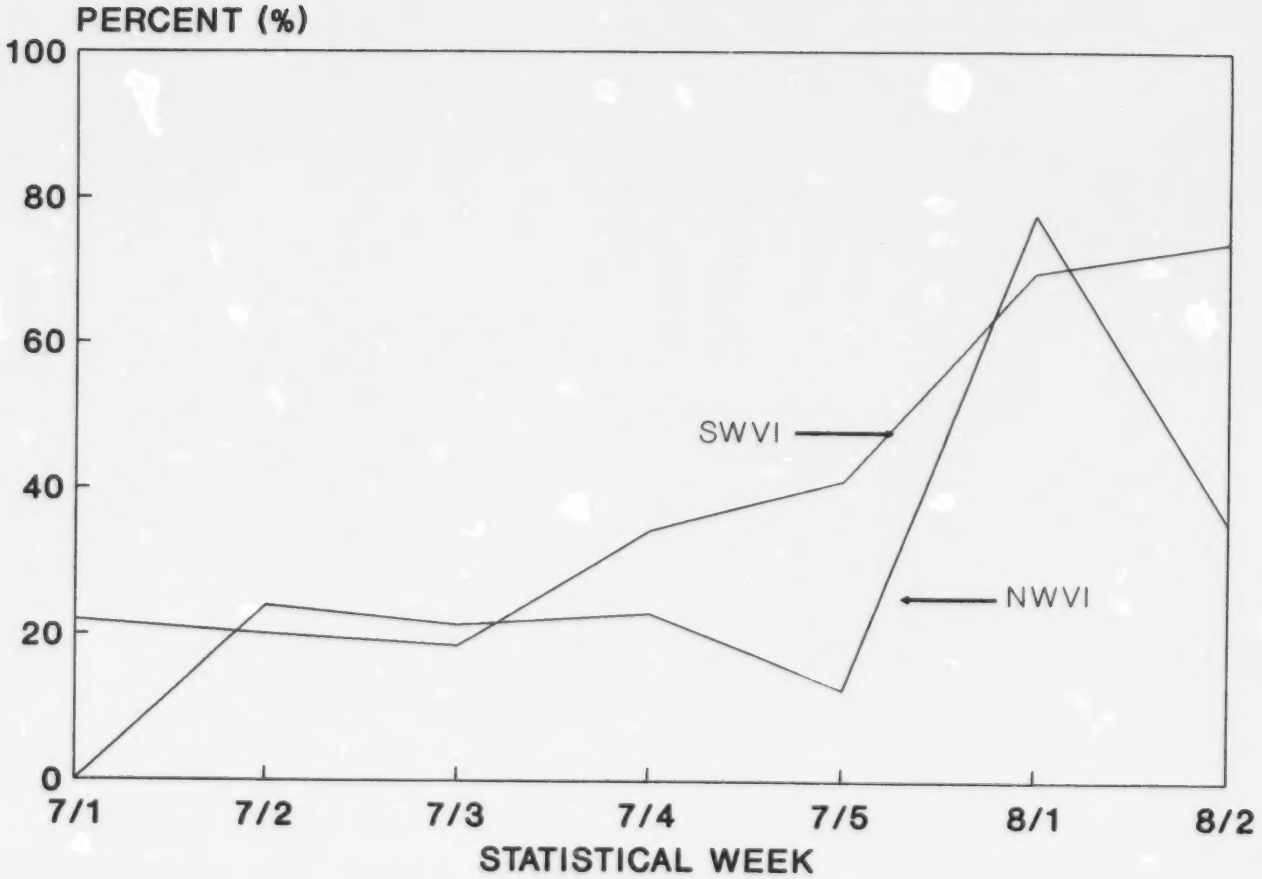


Figure 21. Weekly percentages of chinook catch that were sublegals from the 1987 West Coast Vancouver Island Sublegal Sampling Program.

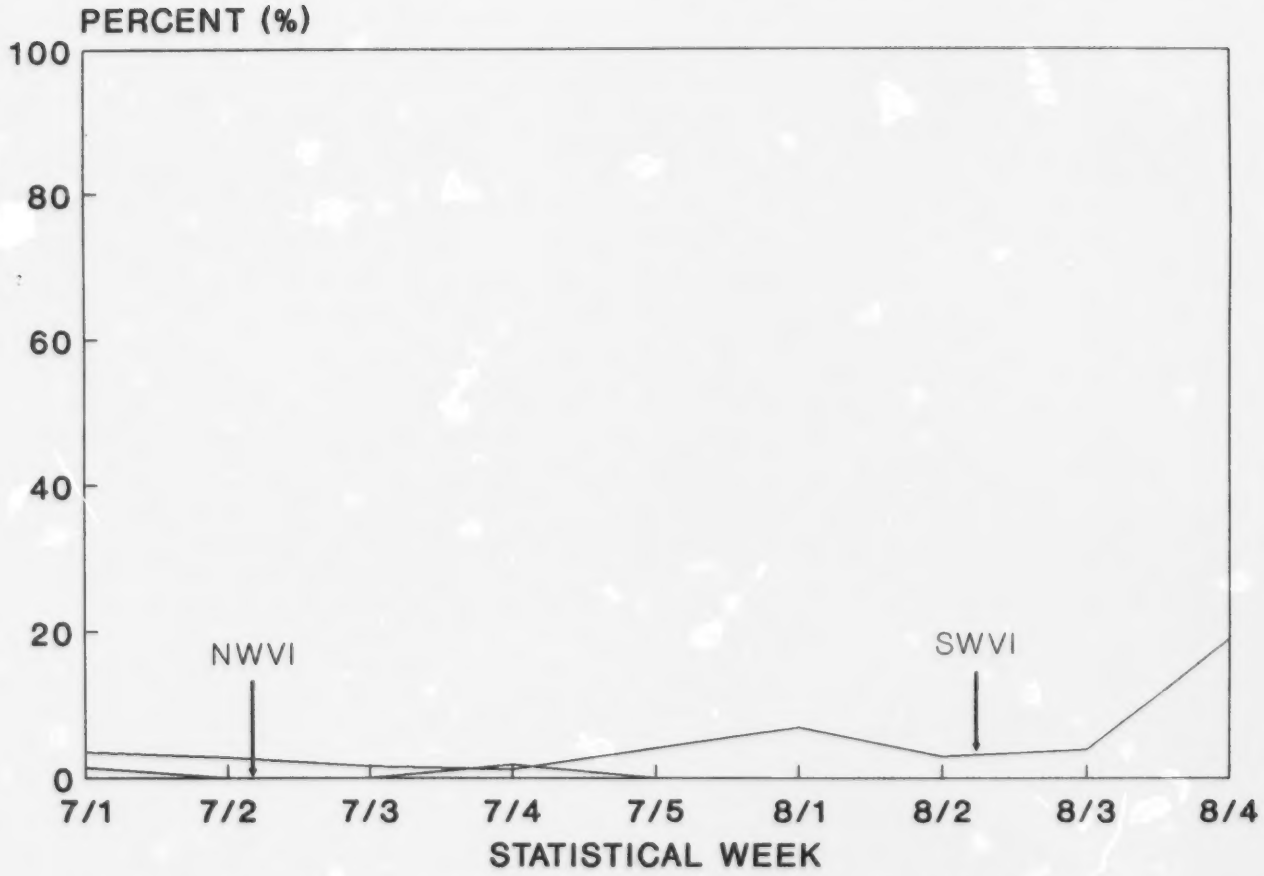


Figure 22. Weekly percentages of coho catch that were sublegals from the 1987 West Coast Vancouver Island Sublegal Sampling Program.

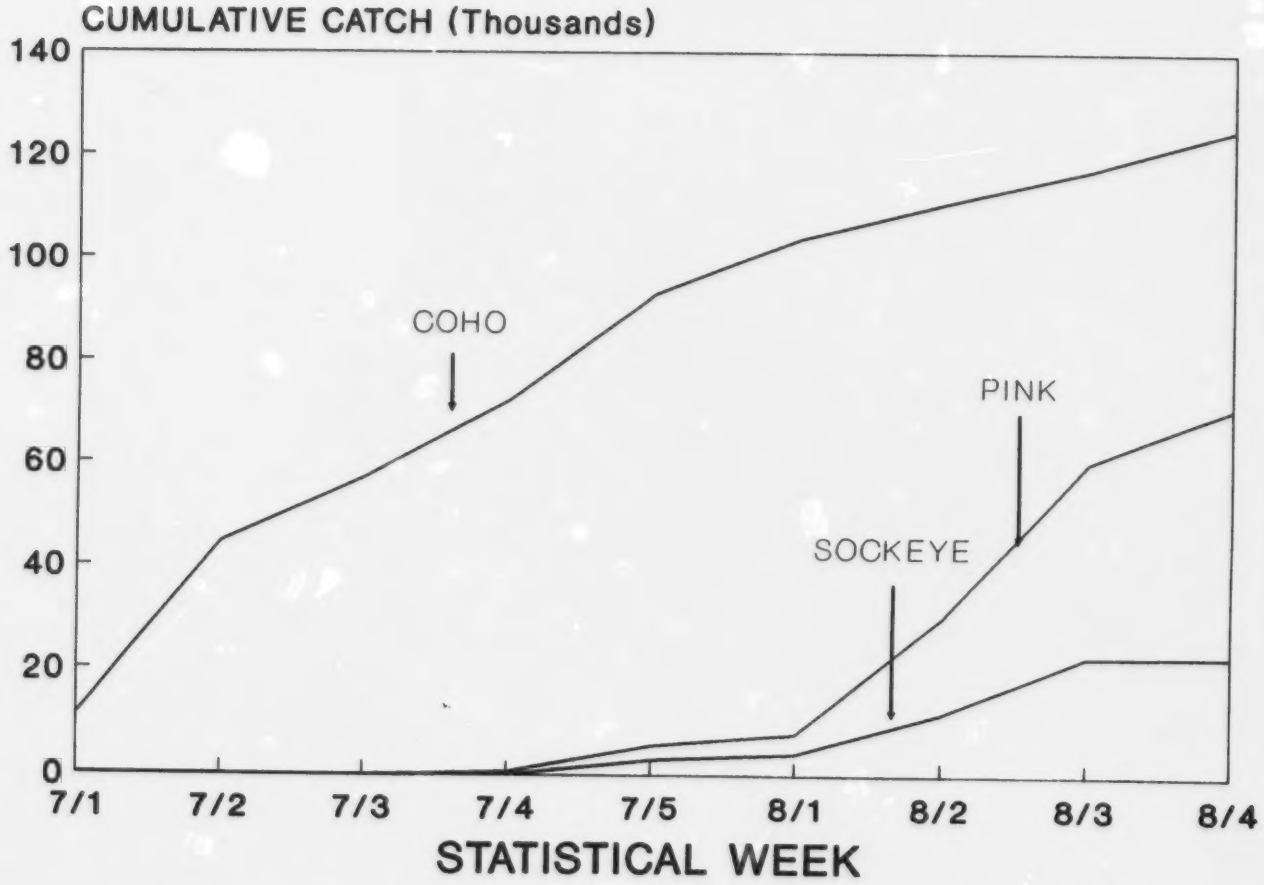


Figure 23. Cumulative weekly troll catch for Johnstone Strait (Area 11&12) in 1987. Chinook (Area 12 only) and chum catches were 1,780 and 2,516 respectively.

TABLES

Table 1. 1987 Catch ceilings and allocations for southern B.C. salmon troll fisheries.

Fishery	Species	Catch Ceiling/Allocation	Comments
1) Strait of Georgia Troll	Chinook	50,000 fish	-Treaty catch ceiling of 275,000 for combined troll and sport. -Minister's allocation of 50,000 to troll. -For Areas 13 to 18 and 29.
	Coho	No specific allocations	
	Sockeye	1.5 to 3.5% of Canadian total allowable catch for Fraser sockeye. Based on pre-season Canadian TAC of 2,389,000 this would be 36,000 to 84,000 pieces (post-season Canadian TAC revised to 3,232,000 with an allocation of 49,000 to 113,000)	-Minister's catch allocation for Areas 13 to 18 and 29. -Allocation to be taken from Chilko and Adams stocks. Earlier timing stocks require conservation.
	Pink	Allocation 4% of southerly migrating pink salmon catch. Total commercial catch of southerly migrating pink salmon 4,017,700. Gulf trollers landed 144,900 or 3.6% of the Canadian TAC of southerly migrating pink salmon.	-Minister's catch allocation for Areas 13 to 18 and 29.
	Chum	Limited to historic levels.	-Directive from the Minister.
2) WCVI Troll	Chinook	360,000 fish	-Treaty catch ceiling for Areas 12, 21 to 27, 121 to 127, and 130-1.
	Coho	1,800,000 fish	-Treaty catch ceilings for Areas 21 to 27, 121 to 127, and 130-1.
	Sockeye	10.5 to 11.5% of Canadian total allowable catch of Fraser sockeye. Based on pre-season Canadian TAC of 2,389,000 this would be 251,000 to 275,000 fish (post-season Canadian TAC revised to 2,232,000 sockeye with an allocation of 339,000 to 372,000 to WCVI troll).	-Minister's catch allocation for Areas 21 to 27, 121 to 127, 130-1, 111, 11 and 12. -Allocation to be taken from late Chilko and Adams stocks. Stocks prior to this required for conservation with the first part of Chilko required for international and domestic allocations.
	Pink	Allocation 29% of southerly migrating pink salmon catch. Total commercial catch of southerly migrating pink salmon 4,017,700. Outside troll catch 1,390,600 or 34.6% of southerly migrating pink salmon catch.	-Period of non-retention required for conservation of Study Area non-Fraser stocks.
	Chums	Limited to historic levels of harvest relative to run strength.	-Catches to be monitored and limited to historic levels of catches as directed by the Minister.

NOTES:
1. Pre- and post-season sockeye TAC values from the report of the Pacific Salmon Commission on the 1987 Fraser River Sockeye and Pink Salmon Fishing Season.

TABLE 2. Summary of Management actions for the 1987 Strait of Georgia troll fishery.

PERIOD	MANAGEMENT ACTIONS			MANAGEMENT AREAS OPEN
	Species Open	Action	Purpose	
July 1 to August 1	Coho Pink Chum Chinook	Season opens with minimum size limit for chinook-62 cm. Barbed hooks permitted Trolling permitted 7 days/wk.	Commence Gulf troll season.	Area 13 13-1 to 13-3, 13-14 to 13-20 adn 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14. Area 18 all sub-areas open except 18-8. Area 29 29-1 to 29-5. Sub-areas 29-6 plus the remaining portion of the Fraser River. "Banana" in 29-3 and 29-4 closed.
August 2 to August 5	Sockeye Coho Pink Chum Chinook	Sockeye opens to trolling 7 days/week in prescribed areas.	Commence sockeye troll fishery on early timing runs. River mouth closures to protect local chinook stock.	Area 13 13-1 to 13-3, 13-14 to 13-20 and 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14, 17-15 and a portion of 17-9. Area 18 sub-areas 18-2 to 18-7, 18-9 and 18-10. Area 29 sub-areas 29-5.
00:01 hr. August 6 to 23:50 hrs. August 6	Sockeye Coho Pink Chum Chinook[1]	Sockeye opens to trolling in prescribed sub-areas of Areas 18 and 29.	Troll fishing times in these areas equal duration to gillnet times.	Area 18 sub-areas 18-1 and 18-11. Area 29 sub-areas 29-1 to 29-4 and 29-6. NOTE: Areas that opened August 2 continue fishing 7 days/week.
August 7 to 17:00 hrs. August 9	Sockeye Coho Pink Chum Chinook	Close Fraser River Areas 18-1, 18-11, 29-1 to 29-4 and 29-6. Sockeye open to trollingin prescribed sub-areas of Area 13.	Troll fishing times in these Areas equal duration to gillnet times.	Area 13 sub-areas 13-7, 13-8, 13-9, 13-10, 13-27 to 13-32. NOTE: Areas that opened August 2 continue fishing 7 days/week.
17:01 hrs. August 9 to August 15	Sockeye Coho Pink Chum Chinook	Close sub-areas 13-7, 13-8, 13-9, 13-10, 13-27 to 13-32.	Distribute sockeye catch to southern Gulf and fishing time linked to net openings.	Area 13 13-1 to 13-3, 13-14 to 13-20 and 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14, 17-15 and a portion of 17-9. Area 18 sub-areas 18-2 to 18-7, 18-9 and 18-10. Area 29 sub-areas 29-5.

[1] Fraser River "Banana" (Areas 29-6 plus portions of 29-3 and 29-4) open with non-retention of chinook.

TABLE 2. (Cont'd)

PERIOD	MANAGEMENT ACTIONS			MANAGEMENT AREAS OPEN
	Species Open	Action	Purpose	
August 16 to August 28	Coho Pink Chum Chinook	Retention of sockeye prohibited.	Estimated that Gulf troll sockeye catch at 72,000 as of Aug. 13. Remaining balance of Gulf troll allocation to up to 10,000 to be harvested during targetted pink fisheries.	Area 13 13-1 to 13-3, 13-14 to 13-20 adn 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14, 17-15 and a portion of 17-9. Area 18 sub-areas 18-2 to 18-7, 18-9 and 18-10. Area 29 sub-areas 29-5.
August 29 to September 3	Sockeye Coho Pink Chum Chinook	Sockeye opens to trolling for an estimated remaining allocation of 15,000.	Fraser River Sockeye run size adjusted upward to 7.3 million.	Area 13 13-1 to 13-3, 13-14 to 13-20 and 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14, 17-15 and a portion of 17-9. Area 18 sub-areas 18-2 to 18-7, 18-9 and 18-10. Area 29 sub-areas 29-5.
September 4 to September 8	Sockeye Coho Chum Chinook	Retention of pink prohibited.	Pink Allocation taken.	Area 13 13-1 to 13-3, 13-14 to 13-20 and 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14, 17-15 and a portion of 17-9. Area 18 sub-areas 18-2 to 18-7, 18-9 and 18-10. Area 29 sub-areas 29-5.
September 9 to September 30	Coho Chum Chinook	Retention of sockeye prohibited.	Sockeye allocation taken.	Area 13 13-1 to 13-3, 13-14 to 13-20 and 13-23. Area 14 all sub-areas open except 14-11 and 14-14. Area 15 all sub-areas open except 15-6. Area 16 all sub-areas open. Area 17 all sub-areas open except 17-7 and 17-14, 17-15 and a portion of 17-9. Area 18 sub-areas 18-2 to 18-7, 18-9 and 18-10. Area 29 sub-areas 29-5.

TABLE 2. (Cont'd)

PERIOD	MANAGEMENT ACTIONS			MANAGEMENT AREAS OPEN
	Species Open	Action	Purpose	
October 1 to October 22		CLOSED TO ALL TROLLING		
October 23 to October 24	Chum	Trolling for chum opens in Area 14.	Troll fishing times equal duration of gillnet times.	Area 14 Portions of sub-areas 14-4, 14-5, 14-7, 14-9 to 14-11.
October 27	Chum	Continue Area 14 troll. Fishing equal to gillnet times.	Estimated troll alloction of up to 2,500 chums.	Area 14 Portions of sub-areas 14-4, 14-5, 14-7, 14-9 to 14-11.
November 12	Chum	Continue Area 14 troll. Fishing equal to gillnet times.	Estimated troll allocation of up to 2,500 chums.	Area 14 Portions of sub-areas 14-4, 14-5, 14-7, 14-9 to 14-11.

TABLE 3. Weekly 1987 troll catch by species and days fishing for the Strait of Georgia.

STAT WEEK	CHINOOK		COHO		CHUM		PINK		SOCKEYE		TROLL DAYS
	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	
7/1	8,800	8,800	27,952	27,952	0	0	0	0	0	0	523
7/2	7,666	16,466	41,365	69,317	0	0	0	0	0	0	879
7/3	3,742	20,208	33,968	103,285	0	0	0	0	0	0	697
7/4	3,905	24,113	38,044	141,329	5	5	0	0	0	0	825
7/5	2,608	26,721	23,426	164,755	0	5	7,358	7,358	749	749	688
8/1	1,139	27,860	6,894	171,649	7	12	15,411	22,769	37,673	38,422	760
8/2	1,103	28,963	3,680	175,329	5	17	33,225	55,994	37,643	76,065	767
8/3	2,483	31,446	9,307	184,636	2	19	15,722	71,716	4,970	81,035	630
8/4	1,427	32,873	9,056	193,692	11	30	13,799	85,515	2,911	83,946	599
9/1	1,010	33,883	6,308	200,000	36	66	52,735	138,250	8,272	92,218	739
9/2	1,245	35,128	4,628	204,628	0	66	5,227	143,477	1,617	93,835	393
9/3	1,152	36,280	3,438	208,066	1	67	152	143,629	15	93,850	315
9/4	1,740	38,020	6,407	214,473	51	118	1,223	144,852	1,225	95,075	288
10/1	674	38,694	3,051	217,524	7	125	52	144,904	150	95,225	281
TOTAL	38,694		217,524		125		144,904		95,225		8,384

NOTES:

1) Catch and troll days are from F.Y.C. Wong (1983) Salmon Catch Data Base and include sales slips processed as of April 13, 1989.
2) Data are for Statistical Areas 13 – 18, 29.

Table 4. Summary of post-season catch ceilings/allocations and actual catches for the 1987 South Coast troll fishery.

Species	Catch Ceiling / Allocation	Actual Catch
	STRAIT OF GEORGIA	
Sockeye	48,000 to 113,000 (1.5 to 3.5% of Canadian TAC of 3,232,000)	95,200 (2.9%)
Coho	No ceiling	217,500
Pink	142,880 (4% of Canadian TAC)	144,900 (3.6%)
Chum	No ceiling	600
Chinook	50,000	38,700
	WEST COAST VANCOUVER ISLAND	
Sockeye	339,000 to 372,000 (10.5 to 11.5% of Canadian TAC of 3,232,000)	569,400 (17.6%)
Coho	1,800,000	1,821,000
Pink	1,035,880 (29% of Canadian TAC)	1,390,600 (34.6%)
Chum	Historical level of harvest relative to run strength	18,600
Chinook	360,000	380,700

Notes:
1. Actual catches are from Tables 3 (Strait of Georgia) and 17 (WCVI).
2. Pink percentage allocation was composed of all South Coast pinks (Study Area plus Fraser) taken in the North, Central and South Coast troll fisheries.
3. The actual catch of WCVI chinook includes 378,931 pieces from WCVI and 1,780 pieces from Area 12.

Table 5. 1987 Strait of Georgia troll gear counts.

STAT WEEK	DATE	STATISTICAL AREA							N.GULF	C.GULF	S.GULF	TOTAL
		13	14	15	16	17	18	29	(13)	(14-17)	(18,29)	
7-1	JUL 01	39	98	10	0	11	1	2	39	119	3	161
7-2	JUL 05	44	101	4	0	10	2	3	44	115	5	164
7-2	JUL 07	6	6	1	0	4	0	0	6	11	0	17
7-2	JUL 11	11	63	1	1	12	1	3	11	77	4	92
7-3	JUL 12	23	67	8	3	7	0	1	23	85	1	109
7-3	JUL 13	27	53	6	2	3	2	1	27	64	3	94
7-3	JUL 15	0	39	10	0	2	6	2	0	51	8	59
7-4	JUL 19	22	76	2	17	11	1	2	22	106	3	131
7-4	JUL 23	29	57	2	0	7	0	4	29	66	4	99
7-4	JUL 25	36	72	1	3	8	0	1	36	84	1	121
7-5	JUL 28	25	58	5	4	13	0	3	25	80	3	108
7-5	AUG 01	10	28	3	3	7	0	2	10	41	2	53
8-1	AUG 03	30	7	3	49	1	17	3	30	60	20	110
8-1	AUG 05	12	6	0	9	1	3	1	12	16	4	32
8-1	AUG 06	0	0	0	0	0	0	148	0	0	148	148
8-1	AUG 07	7	7	1	19	0	7	0	7	27	7	41
8-2	AUG 13	0	0	0	0	0	11	11	0	0	22	22
8-2	AUG 14	39	20	2	19	6	18	5	39	47	23	109
8-3	AUG 16	12	17	1	4	6	14	1	12	28	15	55
8-3	AUG 19	31	61	1	1	7	6	8	31	70	14	115
8-3	AUG 22	23	39	2	2	7	8	1	23	50	9	82
8-4	AUG 25	12	35	2	3	12	5	6	12	52	11	75
9-1	AUG 30	44	23	3	11	1	5	2	44	38	7	89
9-1	SEP 02	52	5	4	8	0	25	3	52	17	28	97
9-1	SEP 02	12	24	2	8	1	5	1	12	35	6	53
9-2	SEP 11	18	39	3	2	8	2	1	18	52	3	73
9-3	SEP 13	18	35	1	2	0	0	0	18	38	0	56
9-3	SEP 15	12	35	1	0	7	1	2	12	43	3	58
9-4	SEP 20	0	6	0	0	1	1	1	0	7	2	9
9-4	SEP 26	3	11	1	0	6	0	2	3	18	2	23
10-1	SEP 28	8	33	1	1	11	3	3	8	46	6	60
10-1	SEP 30	17	27	0	0	14	6	2	17	41	8	66
10-4	OCT 23	0	20	0						20		
10-4	OCT 24	0	24	0						24		
10-5	OCT 27	0	16	0						16		
11-2	NOV 12	0	10	0						10		

NOTE:

1) October 23, 24, 27 and November 12 counts were from on-water hails. All other counts were from aerial overflights.

Table 6. Comparison of the proportion of each species caught and catch per effort from the 1987 Strait of Georgia Sublegal Sampling Program and sales slip estimates.

		CHINOOK	COHO	SOCKEYE	PINK	CHUM
PROPORTIONAL CATCH (PIECES)	-SUBLEGAL PROGRAM	16.4%	42.8%	16.7%	24.1%	0.0%
	-SALES SLIPS	7.8%	43.8%	19.2%	29.2%	0.0%
CPE (CATCH PER DAY)	-SUBLEGAL PROGRAM	8.6	22.6	8.7	12.8	0.0
	-SALES SLIPS	4.6	24.3	11.4	17.3	0.0

NOTES:

1) Sales slip data from F.Y.C. Wong (1983) based on sales slips processed as of April 13, 1989.
2) Catch per day was calculated by dividing total catch for each species by total effort (boat days).
3) A day for the test program was assumed to be 10 hours.

Table 7. Weekly effort, catch, releases and fish sampled by trollers involved in the Strait of Georgia Sublegal Sampling Program.

STAT WEEK	HOURS FISHED	FISH KEPT LEGAL					FISH RELEASED SUBLEGAL	
		CHINOOK	COHO	SOCKEYE	PINK	CHUM	CHINOOK	COHO
7/1	138.0	238	599	0	12	0	34	13
7/2	199.0	179	731	0	17	0	53	30
7/3	155.5	137	440	0	2	0	32	85
7/4	151.0	74	595	0	11	0	51	239
7/5	186.5	194	563	0	122	0	74	404
8/1	136.0	9	45	918	323	0	33	66
8/2	173.5	79	193	330	584	0	104	170
8/3	168.0	195	259	79	97	0	154	303
8/4	130.5	120	195	21	144	0	130	233
9/1	133.5	69	78	144	841	0	86	147
9/2	107.5	165	118	1	4	0	187	155
9/3	6.0	2	5	0	0	0	27	10
9/4	5.0	1	5	0	0	0	18	17
TOTAL	1690.0	1462	3826	1493	2157	0	983	1872

NOTE:

Fish released refer to sublegal chinook less than 62 cm (fork length) or coho less than 30 cm (fork length). Fish kept are chinook 62 cm and greater or coho 30 cm and greater. Data are from Statistical Areas 13-18 and 29.

Table 8. Percentage of sublegal chinook and coho by age from the Strait of Georgia Sublegal Sampling Program.

	AGE 1	AGE2	AGE 3	AGE 4	SAMPLE SIZE
CHINOOK:					
JULY	0.0%	64.3%	35.7%	0.0%	56
AUGUST	6.6%	85.5%	7.9%	0.0%	76
SEPTEMBER	19.0%	69.0%	11.9%	0.0%	42
ALL MONTHS	6.7%	68.2%	24.6%	0.5%	174
COHO:					
JULY	0.0%	97.7%	2.3%	0.0%	87
AUGUST	1.0%	99.0%	0.0%	0.0%	101
SEPTEMBER	0.0%	97.6%	2.4%	0.0%	41
ALL MONTHS	0.4%	97.4%	2.2%	0.0%	229

NOTE:
"Sample Size" does not include unaged fish.

Table 9. Mean fork length (mm) by age of sublegal chinook from the 1987 Strait of Georgia Sublegal Sampling Program.

		UNAGED	AGE 1	AGE 2	AGE 3	AGE 4	ALL AGES
MARCH	N	1	0	1	17	1	20
	MEAN	475	0	425	522	550	517
	STD DEV	0.0	0.0	0.0	48.3	0.0	50.8
	MAXIMUM	475	0	425	600	550	600
	MINIMUM	475	0	425	395	550	395
JULY	N	21	0	36	20	0	77
	MEAN	457	0	373	544	0	440
	STD DEV	73.5	0.0	72.4	41.2	0.0	96.7
	MAXIMUM	580	0	470	600	0	600
	MINIMUM	356	0	220	457	0	220
AUGUST	N	17	5	65	6	0	93
	MEAN	328	238	311	514	0	323
	STD DEV	120.3	9.3	96.7	29.4	0.0	110.0
	MAXIMUM	550	250	520	550	0	550
	MINIMUM	195	225	200	460	0	195
SEPTEMBER	N	9	8	29	5	0	51
	MEAN	352	257	313	505	0	330
	STD DEV	110.3	20.6	82.3	128.7	0.0	108.5
	MAXIMUM	535	285	515	591	0	591
	MINIMUM	240	230	235	250	0	230
ALL MONTHS	N	49	13	133	48	1	244
	MEAN	396	250	331	528	550	380
	STD DEV	118.4	19.5	93.0	59.7	0.0	122.3
	MAXIMUM	595	285	525	600	550	600
	MINIMUM	195	225	200	250	550	195

NOTE:
"Unaged " are the result of scale samples that were regenerate, upside down or missing and therefore unable to be aged.

Table 10. Mean fork length (mm) by age of sublegal coho from the 1987 Strait of Georgia Sublegal Sampling Program.

		UNAGED	AGE 1	AGE 2	AGE 3	AGE 4	ALL AGES
JULY	N	15	0	85	2	102	77
	MEAN	247	0	261	388	261	440
	STD DEV	42.6	0.0	26.1	52.5	35.1	96.7
	MAXIMUM	320	0	320	440	440	600
	MINIMUM	165	0	190	335	165	220
AUGUST	N	18	1	100	0	119	93
	MEAN	260	235	271	0	269	323
	STD DEV	22.1	0.0	27.9	0.0	27.4	110.0
	MAXIMUM	295	235	383	0	383	550
	MINIMUM	215	235	215	0	215	195
SEPTEMBER	N	9	0	40	1	50	51
	MEAN	282	0	281	445	285	330
	STD DEV	25.6	0.0	32.8	0.0	38.8	108.5
	MAXIMUM	340	0	425	445	445	591
	MINIMUM	255	0	230	445	230	230
ALL MONTHS	N	44	1	225	5	275	244
	MEAN	268	235	269	446	272	380
	STD DEV	48.2	0.0	29.2	63.2	41.3	122.3
	MAXIMUM	465	235	425	525	525	600
	MINIMUM	165	235	190	335	165	195

NOTE:
"Unaged " are the result of scale samples that were regenerate, upside down or missing and therefore unable to be aged.

Table 11. Percentages of sublegal chinook and coho from the 1987 Strait of Georgia Sublegal Sampling Program.

	JULY	AUGUST	SEPTEMBER	ALL MONTHS
CHINOOK:				
MALE	51%	71%	51%	59%
FEMALE	49%	29%	49%	41%
SAMPLE SIZE	84	89	51	224
COHO:				
MALE	85%	69%	54%	72%
FEMALE	15%	31%	46%	28%
SAMPLE SIZE	97	117	50	264

TABLE 12. West Coast Vancouver Island troll chinook catch projections, red line, and estimated catch for 1987.

STAT WEEK	EXPECTED CATCH	IDEAL CATCH	RED LINE PERCENT	RED LINE CATCH	IN-SEASON CATCH ESTIMATE	SALES SLIP CATCH ESTIMATE
7/1	46,024	44,701	30.0%	58,111	117,900	24,508
7/2	117,517	114,138	27.0%	144,956	182,900	169,449
7/3	156,470	151,971	24.0%	188,444	212,800	225,923
7/4	198,554	192,845	21.0%	233,343	259,900	264,874
7/5	230,912	224,273	18.0%	264,642	304,000	314,009
8/1	257,344	249,945	15.0%	287,437	324,100	341,430
8/2	274,715	266,816	12.0%	298,834	331,100	359,640
8/3	300,086	291,458	9.0%	317,689	421,800	377,587
8/4	318,979	309,808	6.0%	328,396	436,400	378,931
9/1	337,503	327,799	4.0%	340,911	425,700	378,931
9/2	358,056	347,761	2.0%	354,717	432,200	378,931
9/3	363,324	352,878	1.0%	356,407	437,400	378,931
9/4	370,657	360,000	0.0%	360,000	384,400	378,931

NOTES:

1) Total expected catch has been simulated based on:
   - chinook abundance similar to 1982-86 average.
   - level of effort and prices similar to 1986.
   - coho abundance equal to 1979-86 average.
   - pink run size equal to 11,000,000 with 30% diversion rate.
   - sockeye run size equal to 6,000,000 wiht 25% diversion rate.
   - weekly catch distributed as in 1985 and 1986.
2) In-Season Catch Estimate are catches as provided in-season each week (see Table 16).
3) Sales Slip Catch Estimates are from F.Y.C. Wong (1983) Salmon Catch Data Base and includes sales slips processed as of April 13, 1989.

Table 13. West Coast Vancouver Island troll coho catch projections, red line, and estimated catch for 1987.

STAT WEEK	CUMULATIVE CATCH IN PIECES						1981-86 AVERAGE CATCH	1987 IDEAL CATCH	RED LINE PERCENT	RED LINE CATCH	IN-SEASON CATCH ESTIMATE	SALES SLIP CATCH ESTIMATE
	1981	1982	1983	1984	1985	1986						
7-1	82,277	56,698	20,423	139,094	36,417	573,248	151,360	384,472	30.0%	499,813	250,400	60,295
7-2	310,282	269,237	498,196	433,965	260,495	880,014	442,032	599,472	27.0%	761,330	487,700	461,392
7-3	450,916	511,952	874,731	608,515	331,607	1,109,870	647,932	829,672	24.0%	1,028,794	565,900	683,412
7-4	618,807	775,381	1,248,309	814,040	498,996	1,332,648	881,364	1,011,965	21.0%	1,224,477	796,300	854,724
7-5	737,984	1,034,191	1,384,613	1,051,671	643,765	1,505,138	1,059,560	1,162,538	18.0%	1,371,795	1,056,900	1,116,630
8-1	820,526	1,103,020	1,638,956	1,262,551	781,692	1,596,197	1,200,490	1,272,393	15.0%	1,463,252	1,156,100	1,310,826
8-2	909,567	1,212,677	1,764,965	1,417,350	879,434	1,701,797	1,314,298	1,394,925	12.0%	1,562,316	1,372,400	1,423,269
8-3	1,052,567	1,296,516	1,850,105	1,608,608	1,019,227	1,781,679	1,434,784	1,486,508	9.0%	1,620,294	1,843,700	1,586,079
8-4	1,114,377	1,391,717	1,927,927	1,753,616	1,120,264	2,156,833	1,577,456	1,616,323	6.0%	1,713,302	1,866,400	1,821,022
9-1	1,201,818	1,470,206	1,992,164	1,885,844	1,212,051	2,156,833	1,653,153	1,672,432	4.0%	1,739,330	1,943,400	1,821,022
9-2	1,274,929	1,524,398	2,049,243	1,988,111	1,265,167	2,156,833	1,709,780	1,737,405	2.0%	1,772,153	1,988,500	1,821,022
9-3	1,322,551	1,602,855	2,101,495	2,153,974	1,314,407	2,156,833	1,775,353	1,771,011	1.0%	1,788,721	2,045,900	1,821,022
9-4	1,351,908	1,681,637	2,132,638	2,172,166	1,360,434	2,156,833	1,809,269	1,800,000	0.0%	1,800,000	1,815,000	1,821,022
10/1	1,379,562	1,767,851	2,167,149	2,172,166	1,387,594	2,156,833	1,838,526					
10/2	1,385,323	1,777,436	2,167,149	2,172,166	1,389,055	2,156,833	1,841,327					

NOTES:

1) Data are cumulative coho catches in pieces for Statistical Areas 21-27 and 121-127.
2) Catches for 1981 - 1987 are from F.Y.C. Wong (1983) Salmon Catch Data Base and include sales slips processed as of April 13, 1989.
3) 1987 Ideal Catch assumes a cumulative proportion based on the 1981-86 average.
4) In-Season Estimates are catches as provided each week in season (see Table 17).

TABLE 14. Summary of Management actions for the 1987 West Coast of Vancouver Island troll fishery.

PERIOD	MANAGEMENT ACTIONS			MANAGEMENT AREAS OPEN
	Species Open	Action	Purpose	
July 1 to August 11	Coho Chum Chinook	Fishery opens with new chinook minimum size limit of 76 cm fork length. Swiftsure Bank(see fig.14) closed for duration of season.	Commence trolling while protecting local chinook stocks (inside surfline). New chinook size limit to conform to that used by USA troll fisheries. Swiftsure Bank closed for conservation of coho and sub-legal chinook.	Outside Surfline: Area 121 except Swiftsure Bank Area (121-1 and the NE half of 121-2), 123 to 127, 111 and 130-1. Inside Surfline: Area 23 all sub-areas except 23-1 and 23-2. Area 24 all sub-areas. Area 26 sub-areas 26-1, 26-7, 26-11. Area 27 all sub-areas except 27-7 to 27-11. Area 11 sub-area 11-1.
July 12 to July 16	Coho Chum Chinook	Chinook area No. 2 closure implemented (see fig. 14).	Slow rate of chinook catch.	121, 123 to 127, 130-1 and 111, 23 except 23-1 and 23-2, 24, 26-1, 26-7, 26-11, 27 except 27-7 to 27-11, 11-1. Except portions of 121, 123, 124 (Swiftsure, Chinook No. 2 closures; see fig. 14 for details).
July 17 to August 6	Coho Chum Chinook	Chinook area "The Wreck" closure implemented (see fig. 14).	Slow continued high rate of chinook catch.	121, 123 to 127, 130-1 and 111, 23 except 23-1 and 23-2, 24, 26-1, 26-7, 26-11, 27 except 27-7 to 27-11, 11-1. Except portions of 121, 123, 124 (Swiftsure, Chinook No. 2 "The Wreck" closures; see fig. 14 for details).
August 7 to August 16	Sockeye Coho Pink Chum Chinook	Sockeye and pink open to trolling except for some areas inside the surfline.	Commence sockeye and pink fishery.	121, 123 to 127, 111, 130-1. Except portions of 121, 123, 124 (Swiftsure, Chinook No. 2 "The Wreck" area closures) 23-3 to 23-11, open to all salmon trolling except sockeye. 24-2, 24-6, 24-8 open to all salmon trolling except sockeye. 11-1, 11-2.
August 17 to August 18	Coho Pink Chum	Trolling for chinook and sockeye closed. Possession and retention of sockeye and chinook prohibited. Swiftsure, Chinook No. 2 and "The Wreck" closures remain in effect.	Estimated catches indicate chinook ceiling and sockeye allocation attained. Possession of sockeye and chinook prohibited in the closed areas to avoid enforcement problems. Chinook area closures remain in effect.	121, 123 to 127, 111, 130-1. Except portions of 121, 123, 124 (Swiftsure, Chinook No. 2 "The Wreck" area closures) 23-3 to 23-11, open to all salmon trolling for coho, pink chum and chinook.
August 19 to August 23	Coho Pink Chum	Trolling for all species of salmon prohibited in portions of Areas 11-1 and 11-2 (OC 276).	Area 11 troll closures to comply with North Coast area closures.	121, 123 to 127, 111, 130-1. Except portions of 121, 123, 124 (Swiftsure, Chinook No. 2 "The Wreck" area closures) 23-3 to 23-11, 24-2, 24-6 and 24-8. Portions of 11-1, 11-2 open to all salmon trolling except sockeye.
August 24	CLOSED TO ALL TROLLING			

TABLE 15. Weekly troll catch by species and days fishing for West Coast Vancouver Island in 1987.

WEEKLY CATCH

STAT WEEK	CHINOOK		COHO		CHUM		PINK		SOCKEYE		TROLL DAYS
	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	
7/1	24,508	24,508	60,295	60,295	472	472	0	0	0	0	832
7/2	144,941	169,449	401,097	461,392	2295	2,767	0	0	0	0	5105
7/3	56,474	225,923	222,020	683,412	2724	5,491	0	0	0	0	4364
7/4	38,951	264,874	171,312	854,724	1682	7,173	0	0	0	0	4378
7/5	49,135	314,009	261,906	1,116,630	2177	9,350	28151	28,151	7085	7,085	5437
8/1	27,421	341,430	194,196	1,310,826	1241	10,591	22197	50,348	13486	20,571	4409
8/2	18,210	359,640	112,443	1,423,269	2500	13,091	216989	267,337	214725	235,296	5021
8/3	17,947	377,587	162,810	1,586,079	4497	17,588	264434	531,771	258647	493,943	6166
8/4	1,344	378,931	234,943	1,821,022	1000	18,588	112897	644,668	4440	498,383	4138
TOTAL	378,931		1,821,022		18,588		644,668		498,383		39,850

NOTES:

1) Catch and troll days are from F.Y.C. Wong (1983) Salmon Catch Database and include sales slips processed to April 13, 1989.
2) Chinook and coho catches are for statistical areas 21–27, 121–127.
3) Chum, pink, and sockeye catches, and troll days are for Statistical Areas 11, 12, 111, 21–27, 121–127 and 130–1.

Table 16. 1987 chinook troll catch for West Coast Vancouver Island as estimated in-season.

Week catch estimates reported	STATISTICAL WEEK OF CATCH													
	7/1	7/2	7/3	7/4	7/5	8/1	8/2	8/3	8/4	9/1	9/2	9/3	9/4	10/1
7/2														
7/3	117,900	65,000												
7/4	116,200	63,300	33,300											
7/5	118,900	65,100	31,300	44,600										
8/1	118,900	65,100	31,800	49,400	38,800									
8/2	118,900	65,100	31,800	49,800	37,000	21,500								
8/3			227,900 *	48,400	33,400	14,000	7,400							
8/4				318,700 *	42,600	26,200	22,400	11,900						
9/1					372,400 *	27,100	24,400	12,500	0					
9/2					381,500 *		41,200 **	3,000	0	0				
9/3					386,100 *		43,100 **	3,000	0	0	0			
9/4					390,500 *		43,900 **	3,000	0	0	0	0		
10/1					338,100 *		43,200 **	3,100	0	0	0	0	0	
10/2					337,900 *		43,300 **	3,100	0	0	0	0	0	0
TTD1		182,900	212,800	259,900	304,000	324,100	331,100	421,800	436,400	425,700	432,200	437,400	384,400	384,300
TTD2					337,900		381,200	384,300						

NOTE:

1) * = Cumulative catch to date.
2) ** = Catch for statistical weeks 8/1 plus 8/2.
3) TTD1 = Total catch to date as reported the week following the statistical week of catch.
4) TTD2 = Total catch to date reported in statistical week 9/4.
5) Catch estimates are from bulletins 1 through 13 of In-season Catch Estimation Program and are based on gear counts, sampled cpe from dockside and sales slips estimates. Catch estimates are for management Areas 21-27 and 121-127.

Table 17. 1987 coho troll catch for West Coast Vancouver Island as estimated in-season.

Week catch estimates reported	STATISTICAL WEEK OF CATCH													
	7/1	7/2	7/3	7/4	7/5	8/1	8/2	8/3	8/4	9/1	9/2	9/3	9/4	10/1
7/2														
7/3	250,400	237,300												
7/4	247,300	212,200	106,400											
7/5	266,500	230,600	108,200	191,000										
8/1	266,500	230,600	112,000	220,100	227,700									
8/2	266,500	230,600	111,900	220,800	224,000	102,300								
8/3			828,100 *	216,100	226,600	73,300	28,300							
8/4				1,080,500 *	251,000	123,000	93,600	295,600						
9/1					1,317,900 *	134,600	120,900	246,500	46,500					
9/2					1,354,600 *		276,100 **	253,500	59,200	0				
9/3					1,378,700 *		292,000 **	255,200	62,600	0	0			
9/4					1,415,900 *		294,100 **	261,700	74,200	0	0	0		
10/1					1,275,800 *		281,100 **	222,100	36,000	0	0	0	0	
10/2					1,240,700 *		282,500 **	227,400	39,000	0	0	0	0	0
TTD1		487,700	565,900	796,300	1,056,900	1,156,100	1,372,400	1,843,700	1,866,400	1,943,400	1,988,500	2,045,900	1,815,000	1,789,600
TTD2					1,240,700		1,523,200	1,750,600	1,789,600					

NOTE:

1) * = Cumulative catch to date.
2) ** = Catch for statistical weeks 8/1 plus 8/2.
3) TTD1 = Total catch to date as reported the week following statistical week of catch (e.g. catch for week 7/2 reported in 7/3).
4) TTD2 = Total catch to date reported in statistical week 9/4.
5) Catch estimates are from bulletins 1 through 13 of In-season Catch Estimation Program and are based on gear counts, sampled cpe from dockside, sales slips. Catch estimates are for management Areas 21-27 and 121-127.

Table 18. 1987 West Coast Vancouver Island troll gear counts.

DATE	SOURCE	COUNT									SWVI	NWVI	NWVI +11,111	WCVI (121–127)	TOTAL
		121	123	124	125	126	127	111	11	12					
JUL 02	DND	14	319	180	7	55	59	–	130	–	513	121	251	634	764
JUL 03	DND	–	–	–	–	–	–	117	62	–	–	–	179	–	179
JUL 06	DND	41	74	231	3	10	56	–	53	–	346	69	122	415	468
JUL 07	DND	–	–	–	–	–	–	36	0	–	–	–	36	–	36
JUL 08	H&L	0	131	173	8	38	123	33	32	0	304	169	234	473	538
JUL 10	DND	0	115	187	22	70	130	39	5	–	302	222	266	524	568
JUL 13	H&L 1	9	72	100	4	45	109	27	26	0	181	158	211	339	392
JUL 15	DND	0	2	0	4	33	25	–	18	–	2	62	80	64	82
JUL 21	DND	58	86	180	78	47	184	33	7	–	324	309	349	633	673
JUL 23	H&L	10	28	151	18	119	213	16	26	0	189	350	392	539	581
JUL 29	DND 1	21	123	107	28	61	101		50	–	251	190	240	441	491
JUL 30	H&L	37	94	97	45	53	166	32	5	0	228	264	301	492	529
AUG 04	DND 2	40	15	30	18	42	102	24	73	–	85	162	259	247	344
AUG 05	DND	–	–	–	–	–	–	24	2	5	–	–	31	–	31
AUG 07	H&L	2	289	5	44	33	110	46	0	0	296	187	233	483	529
AUG 09	DND	12	37	65	10	0	55	5	4	–	114	65	74	179	188
AUG 10	DND	–	–	–	–	–	–	2	–	–	–	–	2	–	2
AUG 12	DND	30	19	365	94	30	73	17	20	–	414	197	234	611	648
AUG 15	H&L	3	102	157	132	14	134	3	63	0	262	280	346	542	608
AUG 17	DND 3	18	47	36	6	5	11	15	15	–	101	22	52	123	153
AUG 20	H&L	3	26	50	27	13	54	32	16	0	79	94	142	173	221
AUG 21	DND	44	410	138	45	21	86	115	12	–	592	152	279	744	871

NOTES:

1 = Radar counts taken at Ucluelet for Areas 121 & 123.
2 = Radar counts taken at Ucluelet for Areas 123 & 124.
3 = Radar counts taken at Ucluelet for Areas 121 – 124.
DND = Overflights by Department of National Defence.
H&L = Overflights by Hook and Line Unit, South Coast Divsion, Fisheries and Oceans.

Table 19. 1987 pink and sockeye troll test fishing. Daily catch, effort and area fished by the Cayman Isle.

DATE	STAT AREA FISHED	EFFORT (MIN.)	CATCH IN PIECES				
			SOCKEYE	PINK	COHO	CHUM	CHINOOK
JUL 6	111	480	1	1	33	1	6
7	111	855	0	2	49	0	2
8	111	675	0	1	27	1	1
9	111	930	0	4	20	4	1
10	111	671	0	1	22	0	0
11	111	480	1	4	4	4	3
12	111	900	4	10	77	6	13
13	111	870	3	4	46	1	17
14	11	540	0	5	7	0	0
15	11	555	0	7	5	0	2
16	111	670	0	2	10	1	0
17	11	805	3	27	42	0	0
18	111	865	12	29	68	0	0
19	111	800	2	23	47	1	0
20	11	400	8	12	11	0	0
21	111	690	7	26	23	1	0
22	11&127	720	7	43	16	4	7
23	127	900	2	150	43	9	4
24	127	845	13	168	21	14	3
25	127	845	13	200	33	11	2
26	127	680	29	192	23	8	6
27	127	845	63	146	10	7	0
28	127	850	73	188	13	3	9
29	127	680	56	56	1	2	5
30	26&127	675	26	60	7	7	4
31	26&127	780	49	54	15	10	1
AUG 1	25&126	770	17	63	11	0	4
2	125	630	15	15	16	0	3
TOTAL		20406	404	1493	700	95	93

Table 20. 1987 pink and sockeye troll test fishing. Daily catch, effort and area fished by the Janice-Ann.

DATE	STAT AREA FISHED	EFFORT (MIN.)	CATCH IN PIECES				
			SOCKEYE	PINK	COHO	CHUM	CHINOOK
JUL 6	111	540	7	1	18	1	0
7	111	810	6	4	48	2	2
8	111	900	2	0	43	4	5
9	111	675	1	0	22	2	1
10	11	555	0	1	7	0	2
11	111	900	1	8	36	4	2
12	111	900	0	9	56	7	0
13	111	900	4	3	34	1	6
14	11	540	1	3	7	0	1
15	11	585	2	7	10	0	0
16	111	615	4	8	9	0	0
17	11	735	1	30	38	0	1
18	11	855	3	42	56	2	6
19	11	780	3	22	39	4	6
20	11	390	2	10	9	0	2
21	11	645	6	20	17	0	0
22	111	840	6	35	53	4	1
23	111	510	2	4	17	0	0
24	111	900	2	36	30	1	3
25	111	900	3	53	12	10	0
26	111	855	19	106	38	33	0
27	111	885	8	36	11	16	1
28	111	720	4	42	8	26	3
29		-	-	-	-	-	-
30	111	660	9	47	15	7	4
31	127	660	20	57	8	12	0
AUG 1	25&126	675	17	12	3	1	2
2	125	615	18	9	5	0	5
TOTAL		19545	151	605	649	137	53

Table 21. 1987 pink and sockeye troll test fishing. Daily catch, effort and area fished by the Ruby Four.

DATE	STAT AREA FISHED	EFFORT (MIN.)	CATCH IN PIECES				
			SOCKEYE	PINK	COHO	CHUM	CHINOOK
JUL 6	125	380	0	5	8	3	3
7	125	477	0	2	18	10	3
8	127	815	16	22	160	19	5
9	127	732	16	157	119	36	3
10	127	677	4	117	75	51	1
11	127	610	13	95	40	51	0
12	127	422	9	23	29	52	3
13	127	575	5	44	61	27	1
14	127	671	17	21	32	2	0
15	127	776	42	35	50	42	7
16	127	450	35	17	12	6	1
17	127	600	54	59	94	6	8
18	126	840	16	79	68	25	1
19	127	825	43	47	11	10	2
20	127	600	7	67	28	14	0
21	127	840	4	175	91	2	2
22	125	720	30	30	20	2	2
23	125	570	48	32	9	4	9
24	125	760	9	21	12	1	1
25	125	760	2	210	41	8	3
26	125	850	34	27	12	7	0
27	125	600	36	10	20	1	1
28	125	720	61	35	36	0	1
29	-	-	-	-	-	-	-
30	125	660	105	236	34	0	1
31	126	930	152	61	11	1	4
AUG 1	126	765	158	165	23	11	2
2	126	585	64	129	63	13	2
3	126	660	65	85	15	1	2
4	126	525	24	50	7	10	0
TOTAL		19395	1069	2056	1199	415	68

Table 22. 1987 pink and sockeye troll test fishing. Daily catch, effort and area fished by the Virgo.

DATE	STAT AREA FISHED	EFFORT (MIN.)	CATCH IN PIECES				
			SOCKEYE	PINK	COHO	CHUM	CHINOOK
JUL 6	125	185	1	2	7	0	5
7	125	480	0	0	6	0	1
8	127	870	6	11	47	19	3
9	127	700	13	4	34	17	5
10	127	700	13	13	33	42	7
11	127	720	11	8	33	25	2
12	127	270	6	2	6	1	2
13	127	855	13	9	48	10	5
14	127	645	3	14	35	9	1
15	127	735	16	16	49	0	12
16	127	435	23	16	9	0	0
17	127	900	85	45	21	6	0
18	127	915	52	104	86	49	2
19	127	675	9	58	8	9	7
20	127	625	9	76	38	11	9
21	127	360	3	18	30	2	0
22	126	870	4	234	66	7	10
23	127	855	15	115	31	21	5
24	127	665	5	24	30	4	2
25	127	870	9	146	60	2	0
26	127	780	21	260	38	8	4
27	127	720	135	63	29	5	0
28	127	900	123	114	13	6	3
29	127	480	85	57	10	1	4
30	127	690	132	50	43	10	2
31	127	750	163	53	21	12	4
AUG 1	127	810	223	69	35	20	2
2	126	660	144	35	74	19	3
3	126	690	76	116	15	5	0
4	127	600	4	14	4	0	1
TOTAL		20410	1402	1746	959	320	101

Table 23. Summary of pink and sockeye catches by Statistical Area from the 1987 troll test fishery.

DATE	AREA 125			AREA 126			AREA 127			AREA 111			AREA 11		
	EFFORT	SOCK.	PINK	EFFORT	SOCK.	PINK	EFFORT	SOCK.	PINK	EFFORT	SOCK.	PINK	EFFORT	SOCK.	PINK
JULY 6	9.4	1	7							17.0	8	2			
7	16.0	0	2							27.8	6	6			
8							28.1	22	33	26.3	2	1			
9							23.9	29	161	26.8	1	4			
10							23.0	17	130	11.2	0	1	9.3	0	1
11							22.2	24	103	23.0	2	12			
12							11.5	15	25	30.0	4	19			
13							23.8	18	53	29.5	7	7			
14							21.9	20	35				18.0	1	8
15							25.2	58	51				19.0	2	14
16							14.8	58	33	21.4	4	10			
17							25.0	139	104				25.7	4	57
18				14.0	16	79	15.3	52	104	14.4	12	29	14.3	3	42
19							25.0	52	105	13.3	2	23	13.0	3	22
20							20.4	16	143				13.2	10	22
21							20.0	7	193	11.5	7	26	10.8	6	20
22	12.0	30	30	14.5	4	234	8.0	5	10	18.0	8	68			
23	9.5	48	32				29.3	17	265	8.5	2	4			
24	12.7	9	21				25.2	18	192	15.0	2	36			
25	12.7	2	210				28.6	22	346	15.0	3	53			
26	14.2	34	27				24.3	50	452	14.3	19	106			
27	10.0	36	10				26.1	198	209	14.8	8	36			
28	12.0	61	35				29.2	196	302	12.0	4	42			
29							19.3	141	113						
30	11.0	105	236	5.0	20	29	17.8	138	81	11.0	9	47			
31				22.5	181	76	29.5	203	149						
AUG 1	8.1	7	12	28.8	185	228	13.5	223	69						
2	20.8	33	24	20.8	208	164									
3				22.5	141	201									
4				8.8	24	50	10.0	4	14						
TOTAL	148.2	366	646	136.8	779	1061	560.6	1742	3475	360.6	110	532	123.1	29	186

NOTES:

1) Effort is in hours fished; catch is in pieces.

Table 24. 1987 pink and sockeye troll test fishing. Daily pink and sockeye catch per effort grouped by Areas 11, 111 and Areas 125 to 127.

DATE	AREAS 11,111					AREAS 125-127				
	EFFORT	SOCKEYE CATCH	PINK CATCH	SOCKEYE CPE	PINK CPE	EFFORT	SOCKEYE CATCH	PINK CATCH	SOCKEYE CPE	PINK CPE
JULY 6	17	8	2	0.5	0.1	9	1	7	0.1	0.7
7	28	6	6	0.2	0.2	16	0	2	0.0	0.1
8	26	2	1	0.1	0.0	28	22	35	0.8	1.2
9	27	1	4	0.0	0.1	24	29	161	1.2	6.7
10	20	0	2	0.0	0.1	23	17	130	0.7	5.7
11	23	2	12	0.1	0.5	22	24	103	1.1	4.6
12	30	4	19	0.1	0.6	12	15	25	1.3	2.2
13	30	7	7	0.2	0.2	24	18	53	0.8	2.2
14	18	1	8	0.1	0.4	22	20	35	0.9	1.6
15	19	2	14	0.1	0.7	25	58	51	2.3	2.0
16	21	4	10	0.2	0.5	15	58	33	3.9	2.2
17	26	4	57	0.2	2.2	25	139	104	5.6	4.2
18	29	15	71	0.5	2.5	29	68	183	2.3	6.3
19	26	5	45	0.2	1.7	25	52	105	2.1	4.2
20	13	10	22	0.8	1.7	20	16	143	0.8	7.0
21	22	13	46	0.6	2.1	20	7	193	0.4	9.7
22	18	8	68	0.4	3.8	35	39	274	1.1	7.9
23	9	2	4	0.2	0.5	39	65	297	1.7	7.7
24	15	2	36	0.1	2.4	38	27	213	0.7	5.6
25	15	3	53	0.2	3.5	41	24	556	0.6	13.5
26	14	19	106	1.3	7.4	39	84	479	2.2	12.4
27	15	8	36	0.5	2.4	36	234	219	6.5	6.1
28	12	4	42	0.3	3.5	41	257	337	6.2	8.2
29	0	0	0	0.0	0.0	19	141	113	7.4	5.9
30	11	9	47	0.8	4.3	34	263	346	7.8	10.3
31						52	384	225	7.4	4.3
AUG 1						50	415	309	8.3	6.2
2						42	241	188	5.7	4.5
3						23	141	201	6.1	8.7
4						19	28	64	1.5	3.4
TOTAL	484	139	718	0.3	1.5	846	2887	5182	3.4	6.1

NOTE:

1.) Catch is in pieces; effort is in hours fished.

TABLE 25. Age composition of sockeye from 1987 pink and sockeye troll test fishing.

AGE	PERCENT								
	AREA 111,127 JULY 6 – 10	AREA 127 JULY 8 – 10	AREA 127 JULY 14 – 15	AREA 127 JULY 167 – 18	AREA 127 JULY 18 – 20	AREA 126,127 JULY 25 – 26	AREA 127 JULY 29	AREA 126 AUGUST 1 – 2	TOTAL ALL SAMPLES
3/1	0	0	2	2	1	0	1	0	1
4/1	0	0	0	0	1	0	0	0	0
4/2	75	76	43	42	67	88	86	89	69
5/2	15	16	48	46	21	10	8	11	24
5/3	6	5	4	3	4	0	4	0	3
3/2	1	2	0	1	0	2	0	0	1
4/3	0	0	0	0	0	0	0	0	0
6/2	0	0	2	0	0	0	0	0	0
6/3	2	0	0	7	6	0	0	0	3
TOTAL	100	100	100	100	100	100	100	100	100
N	85	55	46	185	115	59	71	145	761

NOTE:
1) Ages are in Gilbert – Rich format.

Table 26. Racial origin of sockeye from 1987 pink and sockeye troll test fishing.

STOCK	PERCENT							
	AREA 111,127 JULY 6 – 10	AREA 127 JULY 8 – 10	AREA 127 JULY 14 – 15	AREA 127 JULY 167 – 18	AREA 127 JULY 18 – 20	AREA 126,127 JULY 25 – 26	AREA 127 JULY 29	AREA 126 AUGUST 1 – 2
NON – FRASER		73	86		74	14	14	2
EARLY STUART			0		2	0	0	0
NAD/GAT/RF/PITT			7		12	4	16	0
FENNEL/BOWRON			1		1	1	1	0
SEYMOUR R.			1		4	10	17	0
CHILCO LK.	NOT		5	NOT	1	0	0	0
CHILCO R.	ANALYSED		0	ANALYSED	6	26	30	29
STELLAKO R.			0		0	15	18	29
BIRKENHEAD R.			0		0	7	1	6
ADAM/L. SHUSWAP			0		0	23	3	31
WEAVER GROUP			0		0	0	0	2
TOTAL			100		100	98	100	100
N	85	55	46	185	115	59	71	145

NOTE:
1) July 8 – 10 and July 25 – 26 analyses are preliminary.
2) "NAD/GAT/RF/PITT" = Nadina/Gates/Raft/Pitt stock grouping.
3) "TOTAL OF SAMPLES ANALYSED" includes only samples from July 14 – 15, 18 – 20, 25 – 26, 29, and

Table 27. Racial origin (%) of pink salmon samples taken in test fishing and from commercial vessels, fishing South West and Northwest Vancouver Island (NFNP = Non-Fraser River and Non-Puget Sound Stocks; Puget = Puget Sound Stocks).

WEEK ENDING DATE SAMPLE COLLECTED	SOUTH WEST VANCOUVER IS.			NORTH WEST VANCOUVER IS.		
	FRASER	NFNP	PUGET	FRASER	NFNP	PUGET
7/3				* 7	* 58	* 35
7/4	92	0	8	* 17	* 27	* 56
7/5	7	1	92	39	47	14
8/1	-	-	-	70	16	14
8/2	61	3	36	73	17	10
8/3	80	2	18	71	8	21

NOTE:

* = Test fishery samples.

Table 28. Cumulative daily diversion rates of sockeye and pink based on 1987 troll test fishing.

SOCKEYE

DATE	AREAS 11,111		AREAS 125-127		R	DIVERSION RATE (%)
	CATCH	EFFORT	CATCH	EFFORT		
JUl 6	8	17	1	9	0.23	81.6%
7	14	45	1	25	0.13	88.8%
8	16	71	23	53	1.91	34.4%
9	17	98	52	77	3.87	20.5%
10	17	118	69	100	4.78	17.3%
11	19	141	93	122	5.64	15.1%
12	23	171	108	134	6.00	14.3%
13	30	201	126	158	5.34	15.8%
14	31	219	146	180	5.73	14.9%
15	33	238	204	205	7.17	12.2%
16	37	259	262	220	8.35	10.7%
17	41	285	401	245	11.38	8.1%
18	56	313	469	274	9.58	9.4%
19	61	340	521	299	9.71	9.3%
20	71	353	537	319	8.36	10.7%
21	84	375	544	339	7.16	12.3%
22	92	393	583	374	6.66	13.0%
23	94	402	648	413	6.71	13.0%
24	96	417	675	450	6.50	13.3%
25	99	432	699	492	6.20	13.9%
26	118	446	783	530	5.58	15.2%
27	126	461	1,017	566	6.57	13.2%
28	130	473	1,274	607	7.63	11.6%
29	130	473	1,274	607	7.63	11.6%
30	139	484	1,537	641	8.34	10.7%

PINK

DATE	AREAS 11,111		AREAS 125-127		R	DIVERSION RATE
	CATCH	EFFORT	CATCH	EFFORT		
JUl 6	2	17	7	9	6.32	13.7%
7	8	45	9	25	1.98	33.5%
8	9	71	42	53	6.20	13.9%
9	13	98	203	77	19.74	4.8%
10	15	118	333	100	26.17	3.7%
11	27	141	436	122	18.62	5.1%
12	46	171	461	134	12.81	7.2%
13	53	201	514	158	12.33	7.5%
14	61	219	549	180	10.95	8.4%
15	75	238	600	205	9.28	9.7%
16	85	259	633	220	8.78	10.2%
17	142	285	737	245	6.04	14.2%
18	213	313	920	274	4.94	16.8%
19	258	340	1,025	299	4.52	18.1%
20	280	353	1,168	319	4.61	17.8%
21	326	375	1,361	339	4.62	17.8%
22	394	393	1,635	374	4.36	18.6%
23	398	402	1,932	413	4.73	17.5%
24	434	417	2,145	450	4.57	17.9%
25	487	432	2,701	492	4.87	17.0%
26	593	446	3,180	530	4.51	18.1%
27	629	461	3,399	566	4.40	18.5%
28	671	473	3,736	607	4.33	18.8%
29	671	473	3,736	607	4.33	18.8%
30	718	484	4,082	641	4.29	18.9%

NOTES:

1. Catch is in pieces; effort is in hours fished.
2. R = [Catch (125-127) * Effort (11,111)] / [Catch (11,111) * Effort (125-127)].
3. Diversion Rate = 1 /(1+R) = The Proportion Using North Entry (i.e. through Areas 11 and 111).

Table 29. Weekly diversion rates of sockeye and pink salmon in 1987 based upon sales slip data.

SOCKEYE

STAT WEEK	AREAS 11,111		AREAS 125-127		R	DIVERSION RATE (%)
	CATCH	EFFORT	CATCH	EFFORT		
8/2	5,792	394	68,190	1,600	2.90	25.6%
8/3	9,386	583	98,148	2,301	2.65	27.4%
TOTAL	15,178	977	166,338	3,901	2.74	26.7%

PINK

STAT WEEK	AREAS 11,111		AREAS 125-127		R	DIVERSION RATE (%)
	CATCH	EFFORT	CATCH	EFFORT		
8/2	17,710	394	80,129	1,600	1.11	47.3%
8/3	26,624	583	111,514	2,301	1.06	48.5%
8/4	10,544	467	33,351	719	2.05	32.7%
TOTAL	54,878	1,444	224,994	4,620	1.28	43.8%

NOTE:

1) Catch is in pieces; effort is in troll days.
2) Catch and effort are from F.Y.C. Wong (1983) Salmon Catch Data Base and includes sales slips processed as of April 13, 1989.
3) R = [Catch (125-127) * Effort (11,111)] / [Catch (11,111) * Effort (125-127)].
4) Diversion Rate = 1 / (1+R) = The proportion using north entry (i.e. through Areas 11 and 111)
5) Diversion rate calculations do not include statistical week 8/1 as most of the effort for this week was directed on chinook and coho.

Table 30. Comparison of the proportion of each species caught and catch per effort from the West Vancouver Island Sublegal Sampling Program with sales slip estimates.

		CHINOOK	COHO	SOCKEYE	PINK	CHUM
PROPORTIONAL CATCH (PIECES)	-SUBLEGAL PROGRAM	9.7%	61.0%	8.4%	20.8%	0.1%
	-SALES SLIPS	11.3%	54.2%	14.8%	19.2%	0.5%
CPE (CATCH PER DAY)	-SUBLEGAL PROGRAM	2.4	26.4	22.8	44.4	0.73
	-SALES SLIPS	3.8	32.0	32.2	56.9	1.28

NOTES:

1) Sales slip data from F.Y.C. Wong (1983) Data Base and include sales slips processed as of April 13, 1989.
2) Catch per day was calculated by dividing total catch for each species by total effort (boat days).

Table 31. Weekly effort, catch, releases and fish sampled by trollers involved in the West Coast Vancouver Island sublegal sampling program.

STATWEEK	HOURS FISHED	FISH KEPT LEGAL					FISH RELEASED SUBLEGAL		FISH SAMPLED	
		CHINOOK	COHO	SOCKEYE	PINK	CHUM	CHINOOK	COHO	CHINOOK	COHO
NWVI:										
7/1	16.0	24	138	0	0	0	0	2	0	0
7/2	37.0	35	174	0	0	0	11	0	0	0
7/3	104.0	233	227	0	0	0	63	0	26	0
7/4	99.0	74	776	0	0	0	22	15	1	0
7/5	31.0	14	181	0	0	0	2	0	0	0
8/1	24.0	2	18	39	86	4	7	0	0	0
8/2	95.0	24	91	550	1402	10	13	0	8	0
8/3	41.0	0	15	0	204	2	13	0	4	0
8/4	14.0	0	0	0	11	2	6	0	0	0
TOTAL	461.0	406	1620	589	1703	18	137	17	39	0
SWVI:										
7/1	114.5	792	901	0	0	0	223	33	3	4
7/2	109.0	176	933	0	0	0	44	27	12	4
7/3	63.0	107	362	0	0	0	24	6	2	2
7/4	116.5	125	792	0	0	0	65	10	15	0
7/5	114.0	76	874	0	0	0	53	37	6	3
8/1	94.5	74	893	97	148	0	171	66	25	8
8/2	193.0	88	2780	920	1125	0	251	86	38	1
8/3	156.5	0	2422	0	896	0	285	99	40	9
8/4	10.5	0	34	0	78	0	47	8	1	1
TOTAL	971.5	1438	9991	1017	2247	0	1163	372	142	32
WCVI:										
7/1	130.5	816	1039	0	0	0	223		3	4
7/2	146.0	211	1107	0	0	0	55	27	12	4
7/3	167.0	340	589	0	0	0	87	6	28	2
7/4	215.5	199	1568	0	0	0	87	25	16	0
7/5	145.0	90	1055	0	0	0	55	37	6	3
8/1	118.5	76	911	136	234	4	178	66	25	8
8/2	288.0	112	2871	1470	2527	10	264	86	46	1
8/3	197.5	0	2437	0	1100	2	298	99	44	9
8/4	24.5	0	34	0	89	2	53	8	1	1
TOTAL	1432.5	1844	11611	1606	3950	18	1300	389	181	32

NOTE:

1) Fish Released refer to sublegal chinook less than 67 cm (fork length) or coho less than 30 cm (fork length). Fish kept are chinook 67 cm and greater or coho 30 cm and greater.
2) NWVI = Areas 25-27, 125-127. SWVI = Areas 21- 24, 121-127. WCVI = 21-27, 121-127.

Table 32. Percentages of sublegal chinook and coho by age from the West Coast Vancouver Island Sublegal Sampling Program.

		AGE 2	AGE 3	AGE 4	SAMPLE SIZE
CHINOOK:					
NWVI	JULY	20.3%	76.1%	3.6%	138
	AUGUST	28.6%	66.7%	4.8%	21
	ALL MONTHS	21.4%	74.8%	3.8%	159
SWVI	JULY	12.1%	81.8%	6.1%	33
	AUGUST	15.1%	82.6%	2.3%	86
	ALL MONTHS	14.3%	82.4%	3.4%	119
COHO:					
NWVI	JULY	72.5%	27.5%	0.0%	40
	AUGUST	100.0%	0.0%	0.0%	3
	ALL MONTHS	74.4%	25.6%	0.0%	43
SWVI	JULY	50.0%	50.0%	0.0%	4
	AUGUST	20.0%	80.0%	0.0%	15
	ALL MONTHS	26.3%	73.7%	0.0%	19

Table 33. Mean fork length (mm) at age of sublegal chinook from West Coast Vancouver Island Sublegal Sampling Program.

NWVI

		UNAGED	AGE 2	AGE 3	AGE 4	ALL AGES
JULY	N	19	28	105	5	157
	MEAN	501	401	568	606	531
	STD DEV	113.17	66.54	65.23	49.43	97.36
	MAXIMUM	675	650	670	650	675
	MINIMUM	300	290	350	520	290
AUGUST	N	3	6	14	1	24
	MEAN	550	351	549	622	502
	STD DEV	32.78	71.08	66.87	0.00	109.05
	MAXIMUM	588	490	629	622	629
	MINIMUM	508	288	392	622	288
TOTAL	N	22	34	119	6	181
	MEAN	508	392	566	608	527
	STD DEV	107.19	70.04	65.72	45.54	99.48
	MAXIMUM	675	650	670	650	675
	MINIMUM	300	288	350	520	288

SWVI

		UNAGED	AGE 2	AGE 3	AGE 4	ALL AGES
JULY	N	5	4	27	2	38
	MEAN	495	352	563	600	534
	STD DEV	62.05	29.70	47.28	0.00	81.85
	MAXIMUM	600	400	635	600	635
	MINIMUM	415	320	450	600	320
AUGUST	N	27	13	71	2	113
	MEAN	533	452	563	0	544
	STD DEV	70.80	35.68	56.33	0.00	68.18
	MAXIMUM	657	497	697	0	697
	MINIMUM	370	370	390	0	370
TOTAL	N	32	17	98	4	151
	MEAN	527	428	563	606	541
	STD DEV	70.88	54.51	53.99	13.86	72.00
	MAXIMUM	657	497	697	630	697
	MINIMUM	370	320	390	595	320

NOTE:

"Unaged" are the result of scale samples that were regenerate, upside down or missing and therefore unable to be aged.

Table 34. Mean fork length (mm) at age of sublegal coho from West Coast Vancouver Island Sublegal Sampling Program.

NWVI

		UNAGED	AGE 2	AGE 3	ALL AGES
JULY	N	12	29	11	52
	MEAN	341	324	420	348
	STD DEV	78.67	37.19	26.88	61.39
	MAXIMUM	453	415	465	465
	MINIMUM	205	245	390	205
AUGUST	N	2	3	0	5
	MEAN	305	273	0	286
	STD DEV	30.00	20.95	0.00	29.39
	MAXIMUM	335	295	0	335
	MINIMUM	275	245	0	245
TOTAL	N	14	32	11	57
	MEAN	336	319	420	343
	STD DEV	74.79	38.89	26.88	61.84
	MAXIMUM	453	415	465	465
	MINIMUM	205	245	390	205

SWVI

		UNAGED	AGE 2	AGE 3	ALL AGES
JULY	N	0	2	2	4
	MEAN	0	303	456	379
	STD DEV	0.00	52.50	4.00	85.30
	MAXIMUM	0	355	460	460
	MINIMUM	0	250	452	250
AUGUST	N	5	3	12	20
	MEAN	409	330	443	417
	STD DEV	66.58	41.43	50.49	66.66
	MAXIMUM	520	385	513	520
	MINIMUM	330	285	315	285
TOTAL	N	5	5	14	24
	MEAN	409	319	445	411
	STD DEV	66.58	48.10	47.00	71.54
	MAXIMUM	520	385	513	520
	MINIMUM	330	250	315	250

NOTE:

1.) "Unaged" are the result of scale samples that were regenerate, upside down or missing and therefore unable to be aged.

Table 35. Percentages of sublegal male and female chinook and coho from West Coast Vancouver Island Sublegal Sampling Program.

		JULY	AUGUST	ALL MONTHS
CHINOOK:				
NWVI	MALE	62%	79%	65%
	FEMALE	38%	21%	35%
	N	157	24	181
SWVI	MALE	39%	55%	51%
	FEMALE	61%	45%	49%
	N	38	110	148
COHO:				
NWVI	MALE	83%	60%	81%
	FEMALE	17%	40%	19%
	N	52	5	57
SWVI	MALE	33%	60%	57%
	FEMALE	67%	40%	43%
	N	3	20	23

TABLE 36. Summary of Management actions for the 1987 Johnstone Strait troll fishery (Areas 11 and 12).

PERIOD	STAT AREA	MANAGEMENT ACTIONS			MANAGEMENT AREAS OPEN
		Species Open	Action	Purpose	
July 1 to August 6	11	Coho Chum Chinook	Fishery opens with barbed hooks permitted. 11-2 closed to protect Smith's Inlet sockeye.	Commence troll season in concert with WCVI and Gulf.	11-1, open 7 days/week.
	12	Coho Chinook	Fishery opens with barbed hooks permitted in Deserters group.	Commence troll season in concert with WCVI and Gulf.	12-10, 12-13, open 7 days/week.
August 7 to August 8	11	All Salmon	Sockeye, chum and pink retention permitted.	Harvest troll allocation.	11-1, 11-2, open 7 days/week.
	12	All Salmon	Sockeye, pink and chum retention permitted during net times only.	Commence sockeye and pink retention in concert with WCVI and Gulf.	12-10, 12-13, open 7 days/week.
August 9 to August 16	11	All Salmon	Continue all species fishery.	Harvest troll allocation.	11-1, 11-2, open 7 days/week.
	12	All Salmon	Open net fishery areas to trolling during net times sockeye, pink, chum in Deserters during net times only.	Allow greater access to sockeye and chum	12-1, 12-3, 12-4 a portion of 12-5, 12-9, 12-9, 12-11 and 12-12 open 1 day. 12-10 and 12-13 open 7 days/week.
August 17 to August 18	11	Coho Chum Pink Chinook	Close sockeye.	Troll allocation for sockeye taken.	11-1, 11-2, open 7 days/week.
	12	Coho Chum Pink	Close sockeye and chinook.	Troll allocation for sockeye and chinook taken.	12-1, 12-3, 12-4, a portion of 12-5, 12-8, 12-9, 12-11 and 12-12 open 1 day. 12-10 and 12-13 open 7 days/week.
August 18 to August 23	11	Coho Pink Chum Chinook	Portions of sub-areas 11-1 and 11-2 closed.	Slow rate of North Coast chinook catch.	Portions of 11-1, 11-2.
	12	Coho Pink	Chum retention prohibited. Net fishery areas closed for trolling.	Allocation of species achieved.	12-10, 12-13, open 7 days/week.
August 24	11	NONE	CLOSED FOR BALANCE	Allocation of species achieved.	CLOSED
	12	NONE	CLOSED FOR BALANCE	Allocation of species achieved.	CLOSED

Table 37. Weekly troll catch by species and days fishing for Johnstone Strait in 1987.

WEEKLY CATCH

STAT WEEK	CHINOOK		COHO		CHUM		PINK		SOCKEYE		TROLL DAYS
	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL	CATCH	CUM. TOTAL		CUM. TOTAL	CATCH	CUM. TOTAL	
7/1	93	93	11,147	11,147	31	31	0	0	0	0	158
7/2	277	370	33,430	44,577	285	316	0	0	0	0	735
7/3	511	881	12,540	57,117	159	475	0	0	0	0	390
7/4	168	1,049	15,350	72,467	179	654	0	0	0	0	528
7/5	311	1,360	20,603	93,070	226	880	5,653	5,653	2,913	2,913	650
8/1	41	1,401	10,758	103,828	333	1,213	2,170	7,82[illegible]	1,104	4,017	496
8/2	299	1,700	7,034	110,862	321	1,534	22,363	30,186	7,817	11,834	462
8/3	77	1,777	6,449	117,311	667	2,201	30,142	60,328	10,925	22,759	641
8/4	3	1,780	7,806	125,117	315	2,516	10,687	71,015	114	22,873	478
9/1	0	1,780	1587	126,704	0	2,516	389	71,404	0	22,873	68
TOTAL	1,780		126,704		2,516		71,404		22,873		4,606

NOTE:

1) Catch and troll days are from F.Y.C. Wong (1983) Salmon Catch Data Base and include sales slips processed as of April 13, 1987.
2) Data are for Statistical Areas 11, 12, and 111 except for chinook which are from Area 12 only.

APPENDICES

APPENDIX 1

NEWS RELEASES AND COMMUNICATIONS REGARDING 1987 SALMON ALLOCATIONS

BACKGROUNDER
FICHE d'INFORMATION

SALMON ALLOCATION PLAN - 1987

The overall fishing plans reflect the departmental goals of achieving escapement goals while harvesting available surpluses.

In-season monitoring during fisheries is undertaken to ensure run strengths are as predicted and that enough salmon escape to spawning grounds.

Those fisheries with catch breakdowns reflect the historical catches between gear types for the management strategies (fishing times and locations) adopted for those specific areas.

NORTH COAST

PINKS - Area 1 - Trollers will fish to Canada-U.S. Treaty levels.

Areas 3, 4 and 5 - Trollers to fish to a maximum of 5% of the total pink catch. If the catch approaches 6%, then DFO is to take steps to curtail the troll fishery.

Areas 1, 3, 4 and 5 - Traditional fishing patterns to be maintained which is aimed at the division of 67% to seines and 26% to gillnets using averages over six cycle years.

Areas 6 and 7 - Traditional fishing pattern to be maintained while ensuring that escapement goals are met.
- Open to both gillnets and seines at the same times.
- In the designated net areas, trollers to fish at the same time as the net gear.

Area 8 - Traditional fishing patterns aim at a split of 86% to 87% to seiners and 13% to 14% to gillnetters.

- Management strategies to be used to minimize impacts on steelhead and chinook while still maintaining the commercial harvest of pinks.

Area 11 - A Gillnet fishery to take place here.

SOCKEYE - Areas 1, 3, 4 and 5 - The breakdown of catch will be 75% to gillnets, 24% Seiners and to 1% trollers based on average of the last three cycle years. Troll catch not to exceed 5% of the total catch.

- more -

Areas 6, 7 and 8 - With traditional fishing patterns, an incidental catch of sockeye is expected.
- Catches will be closely monitored to ensure no excessive harvest of Rivers Inlet sockeye occurs.

Areas 9 and 10 - A gillnet fishery to take place in this area.
- Traditional troll fishery to coincide with net fishing times.

CHUM - Queen Charlotte Islands and Areas 7 and 8:
- Openings will depend on stock abundance. If surpluses are identified traditional fishing patterns will be maintained with openings for both seines and gillnets at the same time.

SOUTH COAST

PINKS - Overall allocation for the south coast pink catch is 58% to seines, 9% to gillnets and 33% to trollers. Of the 33% total troll catch the outside troll share is 29% and the Gulf troller share is 4% of the total pink catch.

SOCKEYE - Area 23 (Barkley Sound) - No openings until surpluses of sockeye are identified. If openings occur , the allocation target will be 60% seine, 40% gillnets.

Fraser-bound sockeye will be allocated - 34.5% to 35% to gillnets, and 51.5% to 52% to seines.
The outside troll share is 10.5% to 11.5%, and the inside troll share is a minimum of 1.5%. The Gulf trollers will fish equal time to the net gear not to exceed 3.5% of the total share.

CHUM - Outside troll: troll catch of chum will be monitored to ensure that the troll fishery does not escalate. If catches increase relative to the strength of the runs, then DFO will initiate measures to curtail the troll fishery.

- Inside Troll: returning south coast chum stocks will be assessed in September. A decision will then be made regarding a troll fishery in Areas 12, 13 and 14 for October.

- more -

- Net Fisheries

South coast inside allocation (including the Fraser River) of 65% toseines, and 35% to gillnets. The Johnstone Strait fishery will be managed so that for every one day the seines fish there will be 1-1/2 days fishing for gillnets. The Oualicum fishery will be used to ensure the inside south coast allocation achieves the goal of the 65% - 35% split. Any other fisheries that occur in the Gulf of Georgia will proceed with opportunities for both gear types whenever practicable. These could also be used to help attain the 65%-35% split.

On the west coast of Vancouver Island there will be an allocation of 50% to seines; 50% to gillnets at Nootka (Area 25) based on a total expected catch in the net fishery of 308,000 pieces. There will also be an allocation of 50% to seines; and 50% to gillnets at Nitinat (Areas 21 and 22) based on a total expected catch in the net fishery of 338,000 pieces.

NEWS RELEASE

COMMUNIQUÉ

NR-PR-87-02

FOR IMMEDIATE RELEASE
June 9, 1987

1987 SALMON ALLOCATION PLAN

VANCOUVER -- After two near-record salmon years, 1987 salmon allocations reflect average historical levels and patterns.

The wholesale value of all salmon species brought $500 million to the British Columbia economy in each of 1985 and 1986. The expected wholesale value in 1987 will be $300 million.

The Honourable Tom Siddon, Minister of Fisheries and Oceans, made the 1987 allocation decisions based on recommendations from the Minister's Advisory Council (MAC).

"Once again," he said, "MAC has served the fishing community and department well. I appreciate its continued dedication to the difficult job of recommending how the valuable resource should be shared."

MAC was replaced in April by the Pacific Advisory Council (PARC), a policy body, but was asked by the Minister to recommend 1987 salmon allocations.

"Specific area management plans are still being discussed by department officials and local advisory groups," said Mr. Siddon, MP for Richmond - South Delta.

The 1987 allocations generally reflect MAC's recommendations.

However, there was no consensus on the south coast allocation of pink and sockeye. Accordingly, the Minister has decided that the south coast pink catch will be allocated 4 per cent for Gulf trollers; 29 per cent for outside trollers; 9 per cent for gillnetters; and 58 per cent for seiners. For Fraser River-bound sockeye the inside trollers will be allocated a minimum of 1.5 per cent and will fish equal to net fishing times not to exceed 3.5 per cent of the total catch. The outside trollers will be allocated 10.5 per cent to 11.5 per cent; gillnetters will receive 34.5 per cent to 35 per cent; and seiners will receive 51.5 per cent to 52 per cent.

- more -

"The overall result provides a modest increase in pink and sockeye for trollers without significantly affecting the net fleet," he said.

Allocations for the north coast will generally reflect the catch levels of troll, gillnet and seine gear types during cycle years. Obligations under the Canada-United States Pacific Salmon Treaty of 1985 have been observed.

Chinook allocations in the Gulf of Georgia will remain at the original allocations established following signing of the Canada-U.S. treaty: 225,000 for sport fishing and 50,000 for trollers.

The Gulf troll fishery is scheduled from July 1 to September 30, with all spot closures in effect. Opening dates for outside trollers and the net fleet were announced previously.

For more information contact:

Eric Kremer,
Chief, Resource Allocation,
Department of Fisheries and Oceans,
1090 West Pender Street,
Vancouver, B.C.,
V6E 2P1
(604) 666-6931

APPENDIX 2

INFORMATION BULLETIN:

1987 SALMON TROLL FISHING PLANS

STRAIT OF GEORGIA

Fisheries and Oceans | Pêches et Océans

Information

June 25, 1987

1987 SALMON TROLL FISHING PLANS

STRAIT OF GEORGIA

Canada

1987 STRAIT OF GEORGIA TROLL PLANS

This Bulletin provides details regarding the 1987 salmon troll fishing plan for the Strait of Georgia.

OVERVIEW

The 1987 Troll Fishing Plan is for statistical Areas 13 to 18 and 29. The season is scheduled from July 1 to September 30 with a possible chum only fishery during October.

1. Fishing for chinook, coho, pink and chum salmon is permitted commencing July 1st.

2. The minimum legal size limit for chinook is 62 cm fork length. This is the same size limit in effect during the 1986 season.

3. The chinook catch allocation for 1987 is 50,000 fish.

4. Barbed hooks will be permitted while fishing for all species.

5. The retention of sockeye is to be coordinated with first net openings in Johnstone Strait and Fraser River. This opening is scheduled for the week beginning July 26, 1987.

6. Troll fishing times for sockeye and pink in the net fishing areas of statistical Areas 13, 18 and 29 are equal to but separate, where possible, from net fishing times. Troll fisheries will follow the net fishery and the start times between Area 13 and Area 29/18 will be coordinated. Coordinated troll openings and fishing times for the northern and southern areas of the Gulf are intended to apportion sockeye and pink catches on a historic basis between these two areas.

7. The catch allocation for sockeye will be a minimum of 1.5% of the current expected Canadian total allowable catch (TAC). Gulf trollers will fish equal to net times not to exceed 3.5% of the TAC. Based on current expected Fraser bound sockeye Canadian TAC of 2,367,000, the Gulf troll allocation will be a minimum of 36,000 to a maximum of 83,000 pieces.

8. The catch allocation for pink salmon is set at 4% of the South Coast combined net and troll catch. Based on current expectations, the Gulf troll allocation is 143,000 of Fraser and Study Area origin combined.

9. Returning South Coast chum stocks will be assessed in September for a possible chum only troll fishery in Areas 12, 13 and 14 during October.

DETAILED 1987 GULF TROLL FISHING PLANS

A) July 1, 1987

As of July 1, 1987, 0001 hours commercial trolling will be permitted 7 days each week with barbed hooks in the following areas with retention of chinook, coho, pink and chum salmon as follows:

Area 13, subareas 13-1 to 13-3 and 13-14 to 13-20 and 13-23 only open.

Area 14, all subareas open except 14-11 and 14-14 (Comox Harbour) which are closed.

Area 15, all subareas open except 15-6 (Toba Inlet) which is closed.

Area 16, all subareas open.

Area 17, all subareas open except 17-7 and 17-14 (Ladysmith and Nanaimo Harbours) which are closed.

Area 18, all subareas open except 18-8 (Cowichan Bay) which is closed.

Area 29, subareas 29-1 to 29-5 only open. Subarea 29-6 plus the remaining portions of the Fraser River "Banana" in sub-areas 29-3 and 29-4 remain closed.

B) Scheduled for week beginning July 26, 1987 (Subject to First Fraser Panel Area and Johnstone Strait Net Openings)

Fishing is permitted for all salmon species as follows:

Area 13, subareas 13-1 to 13-3 and 13-14 to 13-20 and 13-23 open 7 days each week.

For subareas 13-7 to 13-10 and 13-27 to 13-32 trolling is scheduled as equal time following the gillnet fishery. The troll fishery would start on the Wednesday or Thursday each week depending on gillnet times.

Area 14, all subareas open 7 days each week except 14-14 and 14-11 (Comox Harbour) which are closed.

Area 15, all subareas open 7 days each week except 15-6 (Toba Inlet) which is closed.

Area 16, all subareas open 7 days each week.

Area 17, all subareas open 7 days each week except 17-7 (Ladysmith Harbour), and 17-14 and 17-15 (Nanaimo Harbour) and a portion of 17-9 (Chemainus River mouth) which are closed.

DETAILED 1987 GULF TROLL FISHING PLANS CONT'D

Area 18, subarea 18-8 (Cowichan Bay) closed, subareas 18-2 to 18-7, 18-9 and 18-10 open 7 days each week. For subareas 18-1 and 18-11 only trolling will be permitted each week following the net fishery. (See Note 4.)

Area 29, subarea 29-5 open 7 days each week. For subareas 29-1 to 29-4 and 29-6 trolling will be permitted each week following the net fishery. (See Note 4.)

NOTE 1: Fishing times are subject to adjustment given in-season assessment of run sizes and timing.

NOTE 2 All openings listed are in effect only until the catch limits are reached.

NOTE 3 In addition to those closures listed above, some local rivermouth boundaries are in effect. All Sport fishing spot closures are also closed to commercial trolling however, regulations regarding the Fraser River "Banana" (Area 29-6 and portions of 29-3, 29-4) may be varied later in the season. Contact the local D.F.O. office for details.

NOTE 4 Trolling in Areas 18-1, 18-11 and 29-1 to 29-4 and 29-6 will be permitted each week following the net fishery and is scheduled as equal duration to the gillnet fishery. The troll fishery in the above listed areas is expected to start on the Wednesday or Thursday each week and coordinated openings a day later are expected in Area 13.

NOTE 5 For clarification: **"GREY AREA"**

Management Area 12

As of July 1, 0001 hours, trolling for chinook and coho only is permitted in subareas 12-10 and 12-13 (Deserters Group) 7 days per week for both Inside and Outside licenced vessels. In all other subareas trolling is restricted to net fishing times and areas for both Inside and Outside licenced vessels with non-retention of chinook for vessels with Inside licences. Troll fishing opportunity in subareas 12-10 and 12-13 will be limited if the troll effort exceeds 1985 levels or if the chinook troll catch in all of Area 12 exceeds 5,000 pieces.

APPENDIX 3

INFORMATION BULLETIN:

1987 SALMON TROLL FISHING PLANS

WCVI AND NORTH COAST

Fisheries and Oceans | Pêches et Océans

Information

June 25, 1987

1987 SALMON TROLL FISHING PLANS

WEST COAST VANCOUVER ISLAND AND NORTH COAST

Canada

1987 COMMERCIAL SALMON TROLL FISHERY PLANS FOR THE W.C.V.I. AND NORTH COAST AREAS

This Bulletin provides details regarding the 1987 salmon troll fishing plan for the West Coast Vancouver Island, Central and North Coast areas. This plan has been developed through consultations with the Outside Troll Advisory Committee (Representatives of Fishing Organizations, Buyers and the Department).

SUMMARY

WEST COAST VANCOUVER ISLAND, CENTRAL AND NORTH COAST AREAS

The minimum size limit for troll caught chinook will be increased from 62 cm to 67 cm in "Overall Length" and from 51 cm to 56 cm for the "Head Off Length". The overall length is defined as from nose to fork of tail. This new length is equivalent to 28 inches nose to tip of tail. The new size limit is the same as currently used in U.S.A. Troll Fisheries and was endorsed by the Committee.

As in recent years, scheduled catch rates ("Red Lines") will be used to track the progression of in-season catches. Should it become necessary to slow catch rates for some species, specific time and area closures will be used.

The Department will increase the enforcement of the new size limit at landing points. The "six lines" regulation will be enforced on the grounds by staff using patrol vessels and private trollers. Salmon piece counts will be required on all Troll Salmon Landing Slips at the time of first landing.

WEST COAST VANCOUVER ISLAND

1. Catches for chinook and coho are limited to 360,000 and 1.80 million pieces respectively in accordance with the Pacific Salmon Treaty in the following areas: 21-27; 121-127; 130-1. Troll caught chinooks from Area 12 will be accounted for within the 360,000 limitation.

2. Trolling for chinook, coho and chum will start July 1 with non-retention of sockeye and pink in effect until late July or early August.

3. Trolling for sockeye and pink will start on or about August 2. This date could vary by up to one week either way as in-season details of run size, stock composition and diversion rates become available.

4. If it becomes necessary to slow the catch rate of chinook and coho for the purpose of avoiding non-retention fisheries, specific time and area closures will be put into effect. These closures have been developed within the Advisory Committee.

WEST COAST VANCOUVER ISLAND CONT'D

5. Swiftsure Bank will remain closed for the season in accordance with the Pacific Salmon Treaty. If required, for the pupose of obtaining catch allocations of pink and sockeye, Swiftsure Bank will be opened.

6. If chum troll catches increase disproportionately to run size, then opportunities for trolling will be limited.

NORTH COAST AND CENTRAL COAST AREAS

1. Pacific Salmon Treaty Chinook In-season Management:

   The 1987 commercial troll catch ceiling in the North Coast is 203,000. The management objective is to control the fishery so that this ceiling is reached September 30, 1987. If the chinook catch in-season is higher than expected closures will be implimented (as developed by the Outside Troll Advisory Committee) to slow the rate of catch.

2. Trolling for all salmon species will start July 1, 1987. **(Please note the exception for sockeye salmon outlined below).**

3. In keeping with the coastal approach to the management of Fraser River sockeye, the following sub-areas are closed to sockeye fishing by means of troll gear: sub-areas 102-3, 107-2, 107-3, 108-1, 108-2, 109, 110, 10-1, 130-2, 130-3, 142-1 and those sub-areas adjacent to 142-1 inside the surfline.

   This closes the southern portion of Queen Charlotte Sound and the southern portion of Area 2W. These North Coast areas will open to sockeye retention in conjunction with the South Coast).

4. Pacific Salmon Treaty Pink In-season Management:

   In order to comply with the Canada/U.S. Pacific Salmon Treaty, the following areas will be closed to pink salmon fishing by means for trolling when the quotas have been attained, as outlined below:

   (a) When the pink salmon troll catch in that portion of Area 1 (excluding sub-areas 1-1, 101-1 and 101-2) reaches 300,000 pieces, sub-areas 101-4, 101-8 and those portions of sub-areas 101-3 and Area 103 north of 54 degrees, 37 minutes north latitude will close to trolling for pink salmon.
   (b) When the pink salmon troll catch in that portion of Area 1 (excluding sub-areas 1-1, 101-1 and 101-2) reaches 800,000 pieces, all of Area 1 excluding sub-areas 1-1, 101-1 and 101-2 will close to trolling for pink salmon.

1987 COMMERCIAL SALMON TROLL FISHERY PLANS FOR THE WEST COAST OF VANCOUVER ISLAND MANAGEMENT AREAS 11, 12, 21-27, 121-127, 130-1

DETAILS

Catch Limitations

As provided for in the Pacific Salmon Treaty, the 1987 troll catch for West Coast Vancouver Island shall not exceed 360,000 chinook and 1.80 million coho salmon in Statistical Areas 21, 23, 24, 25, 26, 27, 121, 123, 124, 125, 126, 127 and 130-1. Troll caught chinook from Area 12, not to exceed 5,000 fish, will be accounted for within the 360,000 chinook allocation. The catch allocation for pink salmon is 29% of the total South Coast combined net and troll catch. Based on expectations, the pink allocations is 1,036,000 pieces for Statistical Areas 21 to 27, 121 to 127, 130-1, 111, 11 and 12. (920,000 Fraser and 116,000 Study Area origin) The catch allocation for Fraser River sockeye is between 10.5% and 11.5% of the Canadian total allowable catch. Based on expectations, the sockeye allocation is between 249,000 and 272,000 pieces for Statistical Areas 21 to 27, 121 to 127, 130-1, 111, 11 and 12. Troll chum catches will be monitored to ensure that the troll fishery does not escalate in 1987. If catches increase disproportionately to the strength of the run, then this fishery will be curtailed.

Trolling Dates

Trolling for chinook coho and chum salmon will start 0001 hours on July 1 and may continue to September 30. However, coho and chinook salmon trolling will be closed prior to September 30 if the catch ceilings are achieved and chum fishing will be closed if troll catches are disproportionately high relative to run strength.

Trolling for pink and sockeye will commence on or about August 2. This date could be varied by up to one week either way as in-season details of run size, stock composition and diversion rates become available. The intent is to; allow all trollers on the WCVI to share in the attainment of the troll fleet allocation, to provide allocation across the main components of the run (Chilko and Adams) and to avoid non-retention fisheries during peak abundance.

It is anticipated, the allocations for sockeye will be achieved in about two weeks and in about four weeks for pink.

If required to achieve allocation of pink and sockeye, Swiftsure Bank will be opened. At that time retention of each species will be permitted, dependent on their ceiling or allocation status.

Scheduled Catch Rates

The troll management plan has been developed to avoid, where possible, non-retention fisheries. Catch rates will be tracked in-season with a system of pre-season forecasted catches. ("Red Line")

Scheduled Catch Rates Cont'd

If the catch rates of chinook and/or coho progress to a level which, if continued, would result in an early end to the fishing season (above the "Red Line"), specific time and area closures will be used to slow the rate of catch. Such closures would occur in the southwest coast area of Vancouver Island and would be implemented after 48 hours notice. The Red Lines and the closure time and area have been developed within the Committee.

Fishing Plan

The detailed fishing plan is as follows:

Outside surfline (Areas 121 to 127, 130-1, and 111.)

As of July 1, 1987, at 0001 hours, the following management areas will open until further notice to commercial salmon trolling for chinook, coho and chum salmon only:

Areas 121 to 127 inclusive and 130-1, 111, except as follows:

Swiftsure bank (Defined as management Areas 21, 121-1 and that portion of Area 121-2 lying easterly of a line connecting the following coordinates (Loran C 5990-Y-28996, 5990-Z-41752 and 5990-Y-28904, 5990-Z-41810 or 48°37.21′, 125°12.90′and 48°29.24′, 124°58.02′) will remain closed until further notice.

Note: Non-retention of sockeye and pink salmon in effect. These species will open to trolling August 2 as indicated in the above areas.

Inside Surfline (Areas 21 and 23 to 27 inclusive, Area 11 and Area 12)

As of July 1, 1987, at 0001 hours, the following areas will open to trolling for chinook, coho and chum salmon only as follows:

Area 21 Remains closed to trolling (part of the Swiftsure closure)

Area 23 All area 23 open except sub areas 23-1 and 23-2 which remain closed until further notice.

Area 24 All area 24 open until August 1 after which only sub areas 24-2, 24-6 and 24-8 will remain open and the remaining sub-areas will be closed until further notice.

Area 25 Remains closed to trolling.

Area 26 Sub areas 26-1, 26-7 and 26-11 open until August 1. The remaining sub areas are closed. Effective August 1 all areas closed to trolling.

1987 COMMERCIAL SALMON TROLL FISHERY PLANS FOR THE NORTH COAST MANAGEMENT AREAS 1 TO 10, 101 TO 111, 130-2, 130-3, 142-1 AND 142-2

DETAILS

Fishing plan

The detailed fishing plan is as follows:

Outside the surfline

As of 0001 hrs July 1, 1987, the following management areas will open to commercial salmon trolling for all species of salmon (Please note the exception for sockeye, listed below):

Areas 101 to 110 inclusive, 130-2, 130-3 and 142

Inside the surfline

As of 0001 hrs July 1, 1987, the following management areas will open to commercial salmon trolling for all species of salmon (Please note the exception for sockeye, listed below):

Area 1	Sub-areas 1-1, 1-2, 1-3, 1-5 and 1-7
2E	All sub-areas
2W	All sub-areas
3	Sub-area 3-1. No other sub-areas will open prior to August 1. Sub-areas 3-2, 3-3, 3-4 and 3-7 are scheduled to open August 9.
4	Sub-areas 4-1, 4-2, 4-3 and 4-13. Sub-area 4-4 is scheduled to open July 5. Sub-areas 4-5, 4-8 and 4-14 are closed until August 9 except during net times. Sub-areas 4-9 and 4-12 open during net times only. Sub-areas 4-6, 4-7, 4-10, 4-11 and 4-15 remain closed to trolling all season
5	All sub-areas
6	Sub-areas 6-9, 6-11, 6-13 and 6-17
7	Sub-areas 7-1, 7-2, 7-18, 7-19, 7-20, 7-23, 7-25, 7-26, 7-27, 7-31 and 7-32
8	Sub-area 8-1
9	Closed
10	Sub-area 10-1. Troll fisheries in sub-area 10-2 will be regulated in concert with sub-area 11-2

SOCKEYE NON-RETENTION AREAS

In keeping with the coastal approach to the management of Fraser Sockeye, the retention of sockeye salmon is prohibited in the following areas:

Sub-areas 102-3, 107-2, 107-3, 108-1, 108-2, 109, 110, 10-1, 130-2, 130-3, 142-1 and those sub-areas adjacent to 142-1 inside the surfline.

This closes the southern portion of Queen Charlotte Sound and the southern portion of Area 2W. These North Coast areas will open to sockeye retention in conjunction with the South Coast.

Fishing Plan Cont'd

Area 27 — Area 27 open until August 1, except 27-7, 27-8, 27-9, 27-10 and 27-11 which are closed. Effective August 1 all of area 27 closed to trolling.

Area 11 — Area 11-1 open. Area 11-2 will be regulated in concert with Area 10-2 and will remain closed until July 26.

For Clarification: **"GREY AREA"**

Area 12 — As of July 1, 0001 hours, trolling for chinook and coho only is permitted in subareas 12-10 and 12-13 (Deserters Group) 7 days per week for both Inside and Outside licenced vessels. In all other subareas trolling is restricted to net fishing times and areas for both Inside and Outside licenced vessels with non-retention of chinook for vessels with Inside licences. Troll fishing opportunities in sub-areas 12-10 and 12-13 will be limited if the troll effort exceeds 1985 levels or if the chinook troll catch in all of Area 12 exceeds 5,000 pieces.

Note: Non-retention of sockeye and pink salmon in effect until fishing for these species is permitted outside the surfline.

APPENDIX 4

WEST COAST VANCOUVER ISLAND

TROLL MODEL

W.C.V.I. TROLL MODEL
SIMULATIONS OF PRELIMINARY
1987 FISHING PLANS

This analysis evaluates the impact on the W.C.V.I. troll fishery of changes in chinook size limits, opening dates for each species, and the effect of proposed time and area closures. The outcome of the model calculations are listed in terms of expected catch, the week in which the catch is reached and, in some cases, the landed weight of the catch. The major assumptions of the calculations are listed below:

1. 1987 Abundance

   - Chinook similar to 1979 - 1986 average abundance.
   - Coho abundance like 1979 - 1986 average.
   - Sockeye abundance according to Salmon Commission prediction of 6.0 million run size and 25% diversion rate.
   - Pink abundance according to Salmon Commission prediction of 11 million run size and 30% diversion rate.

2. 1987 Timing

All run timings are like 1983 except for coho in week 7-1 to 7-3. The coho catch in these early weeks were delayed to approximate a more normal rate of coho catch.

LIST OF SIMULATIONS

Base Run A - Open to all species July 1 and close September 30 or on ceilings. Chinook size limit 62 cm.

Base Run B - Open to chinook, coho and chum July 1 and pink and sockeye August 1 and close on ceilings or September 30. All simulations listed below assume this base run. Chinook size limit 62 cm.

Simulation 1 - 67 cm chinook size limit.

Simulation 2 - Swiftsure Bank closure only.

Simulation 3 - 67 cm chinook size limit and Swiftsure closure.

Simulation 4 - 64.5 cm chinook size limit and Swiftsure closure.

Simulation 5 - Total closure W.C.V.I. week 7-5 plus Simulation 3.

Simulation 6 - Pink and sockeye open week 7-5 plus Simulation 3.

Simulation 7 - Pink open week 8-1, sockeye open 8-2 plus Simulation 3.

RESULTS

CHINOOK:

Simulation	Catch	Week When Ceiling is Reached	Landed Weight lbs
Base A	360,000	9-3	3,816,000
Base B	360,000	9-2	3,816,000
Simulation 1	327,000	Not in Season	4,153,000
Simulation 2	357,000	9-4/10-1	3,784,200
Simulation 3	282,000	Not in Season	3,553,000
Simulation 4	320,000	Not in Season	3,712,000
Simulation 5	279,000	Not in Season	3,543,000

COHO:

Simulation	Catch	Week When Ceiling is Reached
Base A	1.8 Million	9-1/9-2
Base B	1.8 Million	9-1
Simulation 1	1.8 Million	9-1
Simulation 2	1.8 Million	9-3

SOCKEYE:

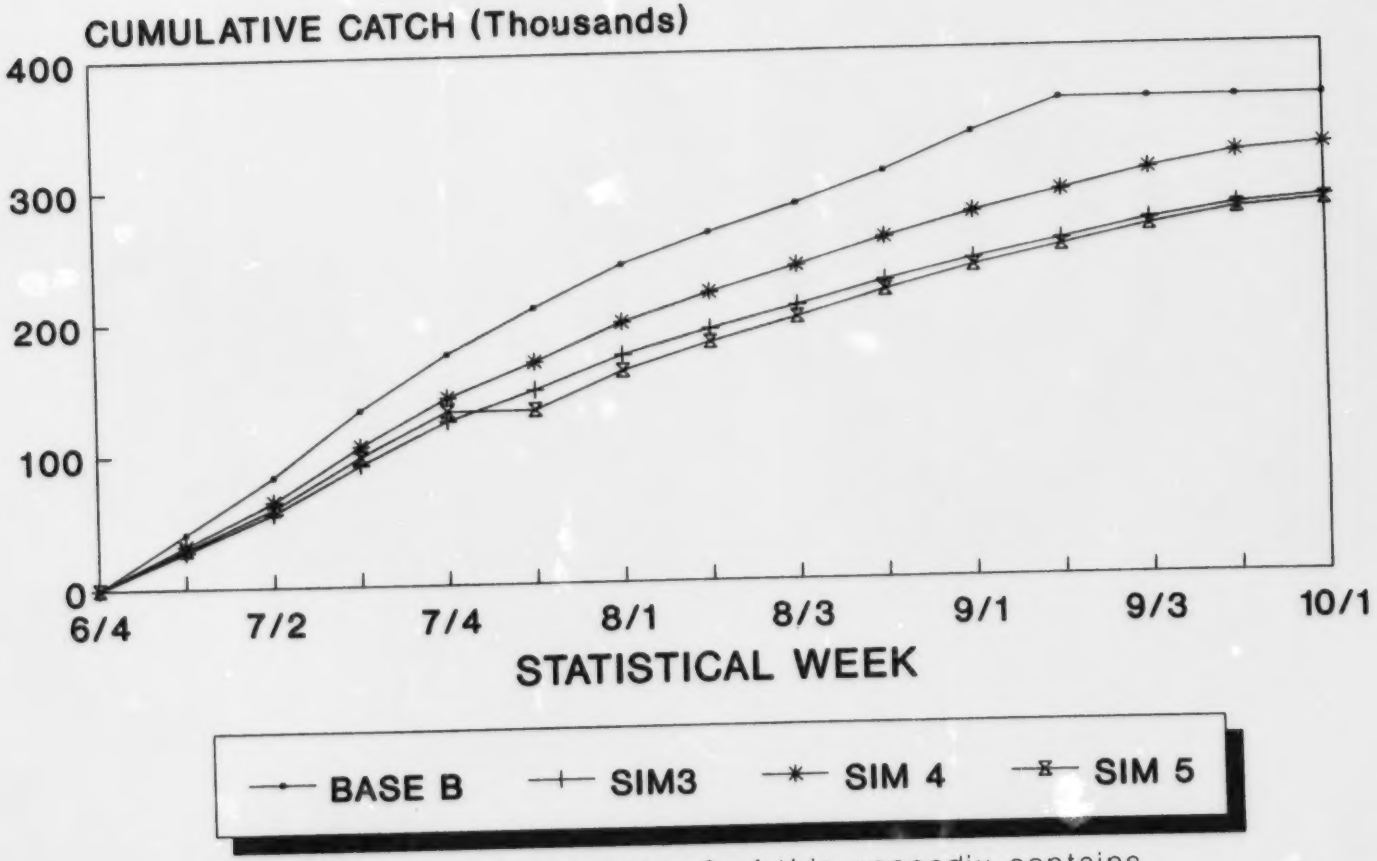
Simulation	Catch	Week When Ceiling is Reached
Base A	264,000	8-1
Base B	264,000	8-3
Simulation 6	264,000	8-1
Simulation 7	264,000	8-4

PINK:

Simulation	Catch	Week When Ceiling is Reached
Base A	813,000	8-4
Base B	813,000	8-4
Simulation 6	813,000	8-4
Simulation 7	813,000	8-4

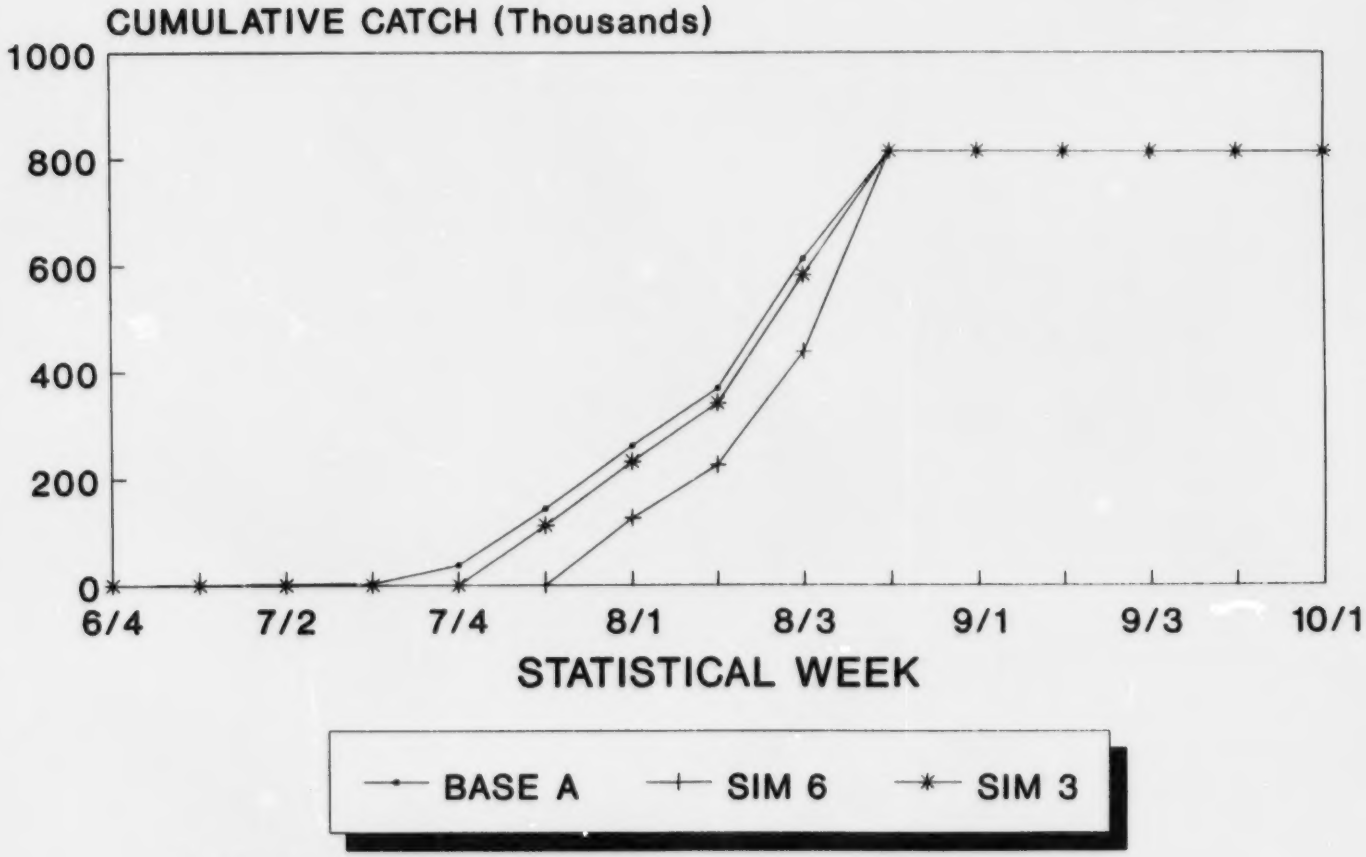
Areas 11 & 12 catches for sockeye and pink are not included here.

WCVI TROLL MODEL SIMULATION 1987
CHINOOK



Note: Sim = Simulation section 2 of this appendix contains the parameter settings for each simulation.

WCVI TROLL MODEL SIMULATION 1987
PINK



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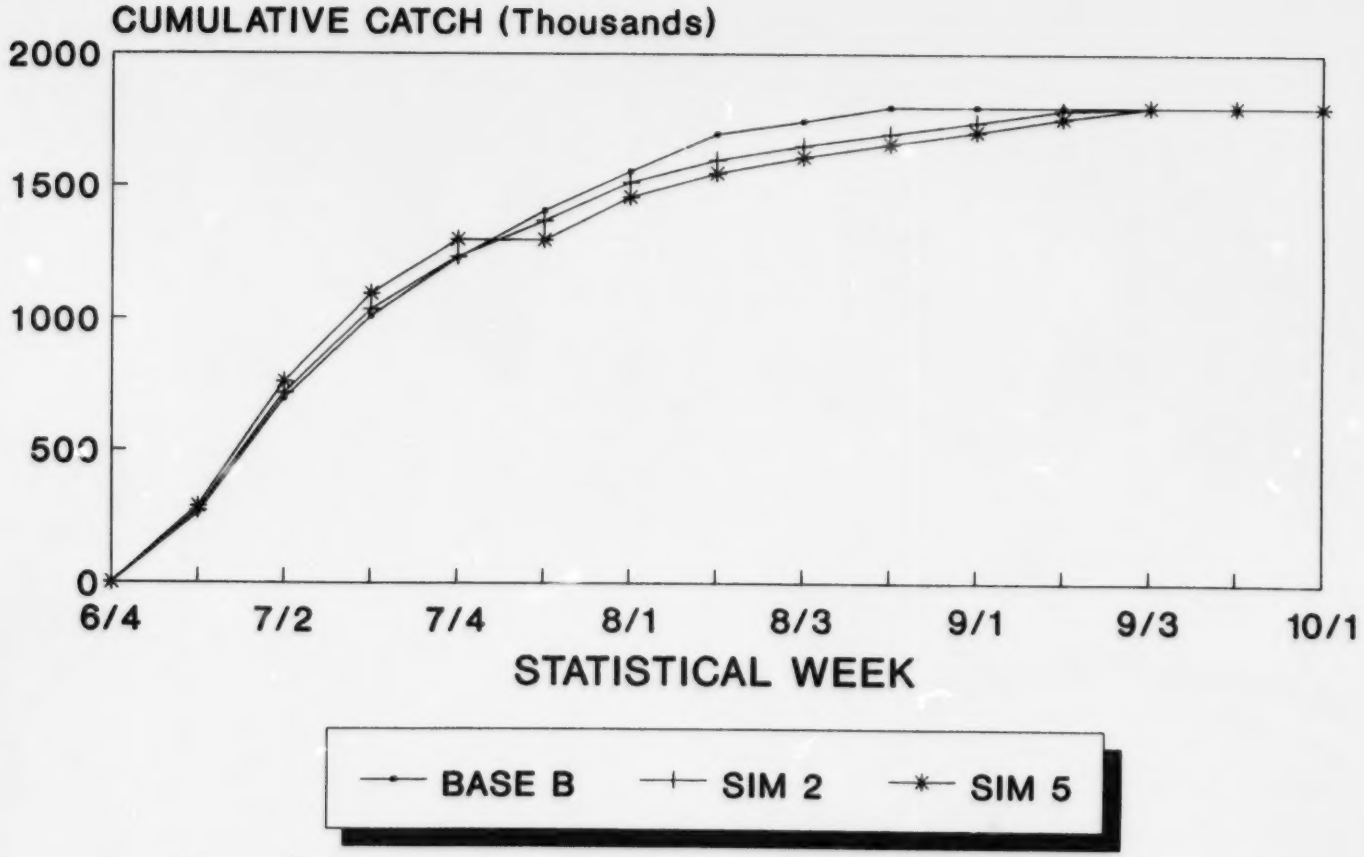
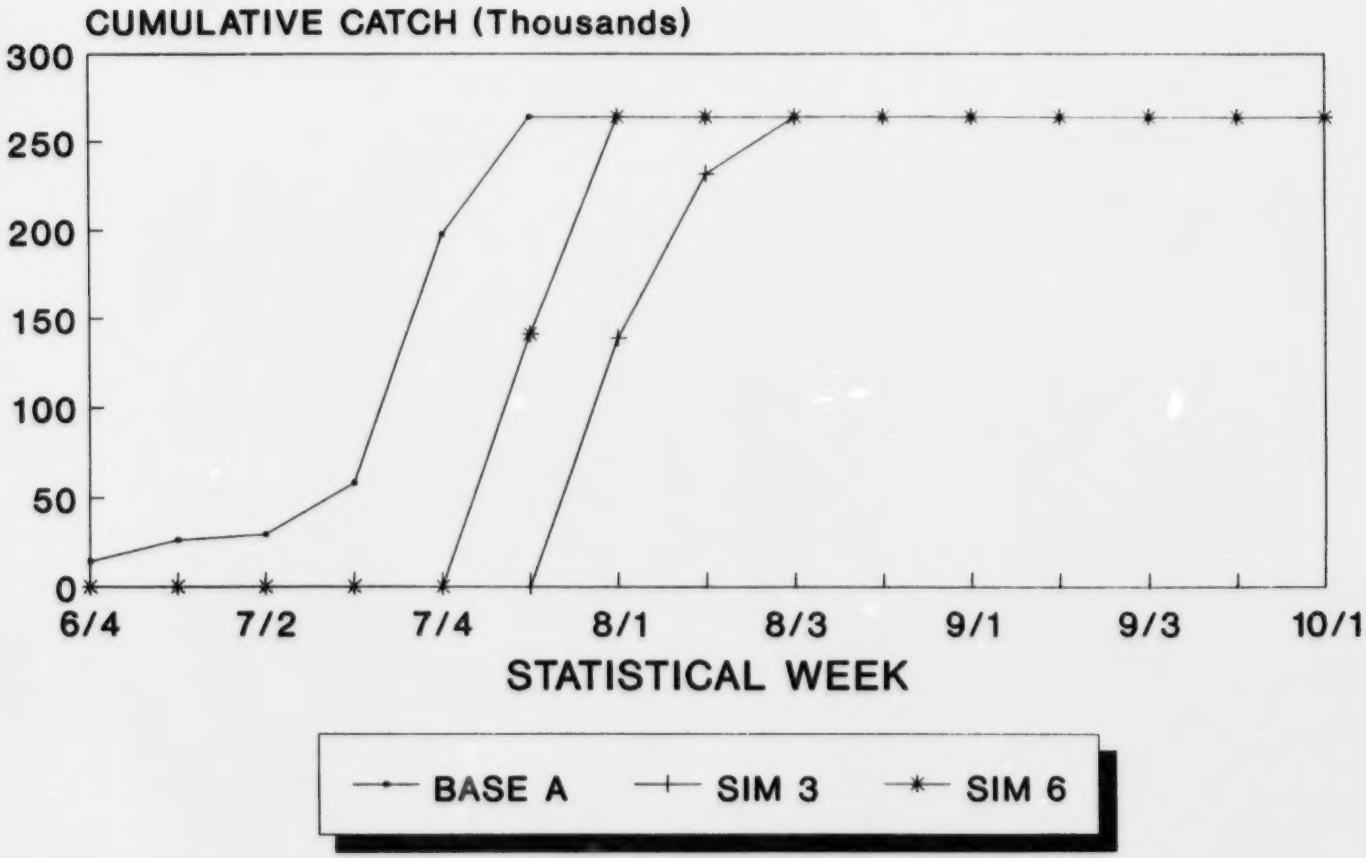
WCVI TROLL MODEL SIMULATION 1987
COHO



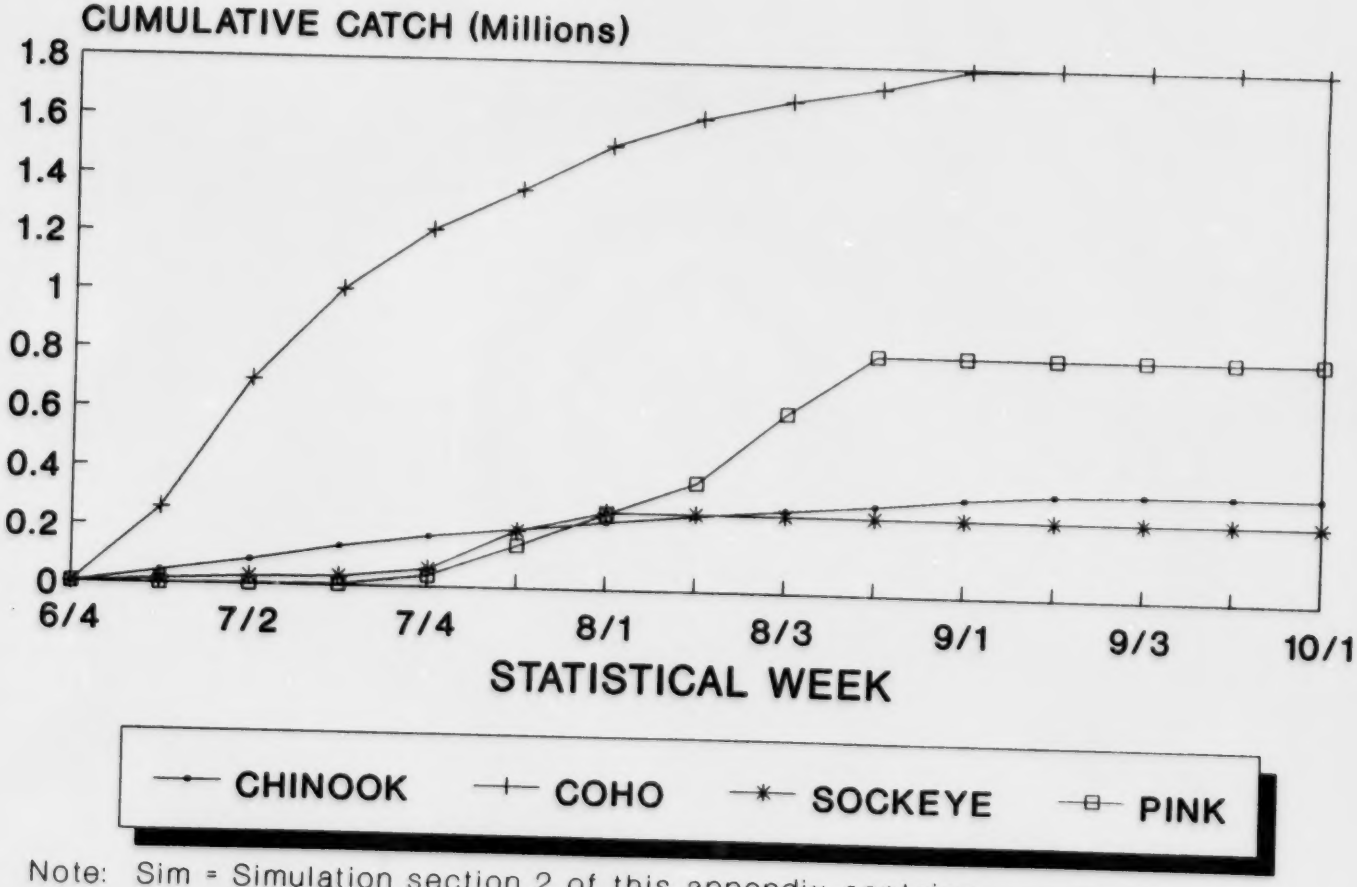
Note: Sim = Simulation section 2 of this appendix contains the parameter settings for each simulation.

WCVI TROLL MODEL SIMULATION 1987
SOCKEYE



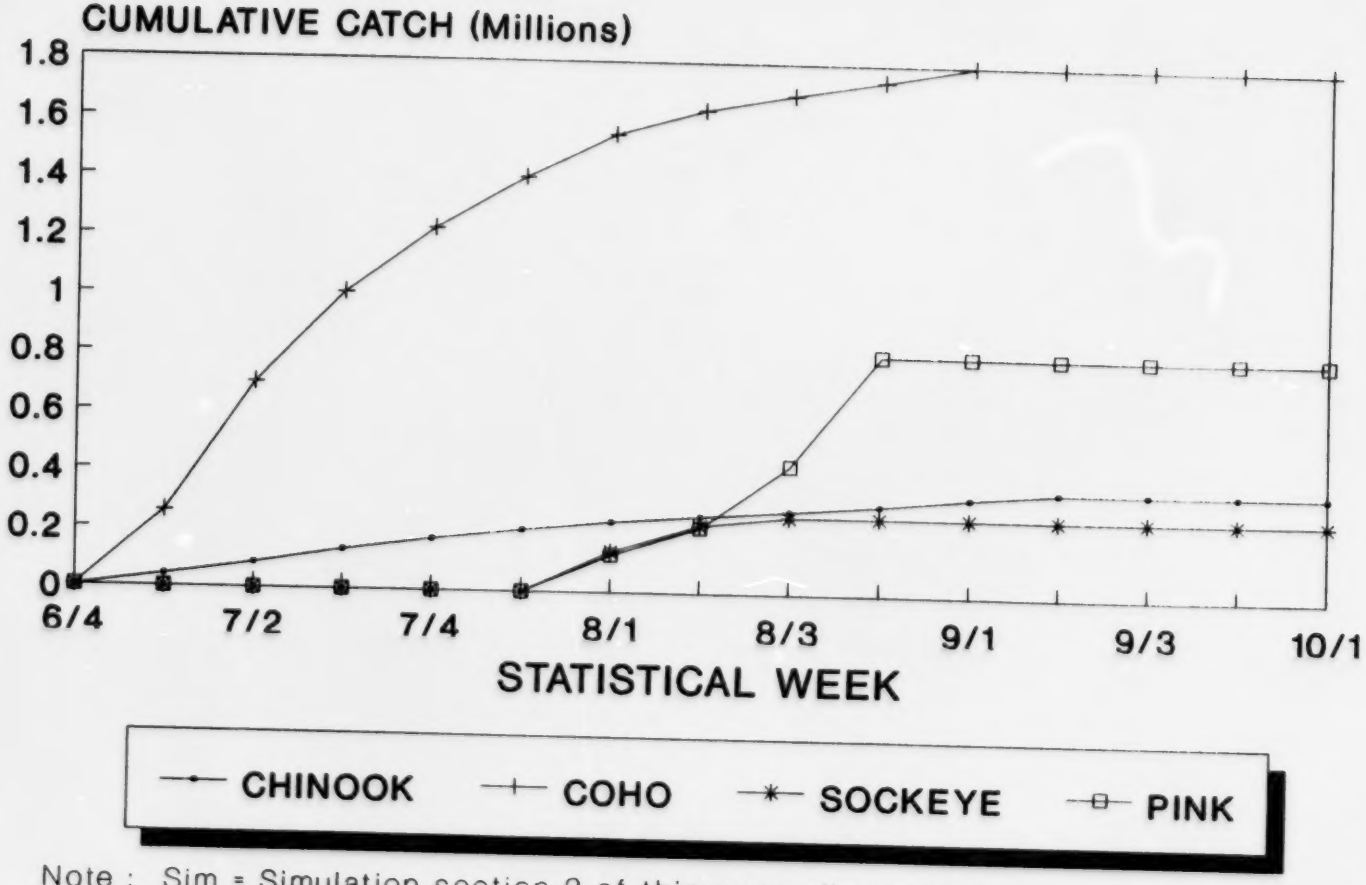
Note: Sim = Simulation section 2 of this appendix contains the parameter settings for each simulation.

WCVI TROLL MODEL SIMULATION 1987
BASE A



Note: Sim = Simulation section 2 of this appendix contains the parameter settings for each simulation.

WCVI TROLL MODEL SIMULATION 1987
BASE B



Note : Sim = Simulation section 2 of this appendix contains the parameter settings for each simulation.